AURORA® AFX® ROAD RACING HANDBOOK

MODEL MOTORING

A COMPLETE GUIDE TO AURORA MODEL MOTORING

Vol.III

AURORA®

AFX ROAD RACING HANDBOOK

VOL. 3

THE COMPLETE GUIDE TO AURORA MODEL MOTORING

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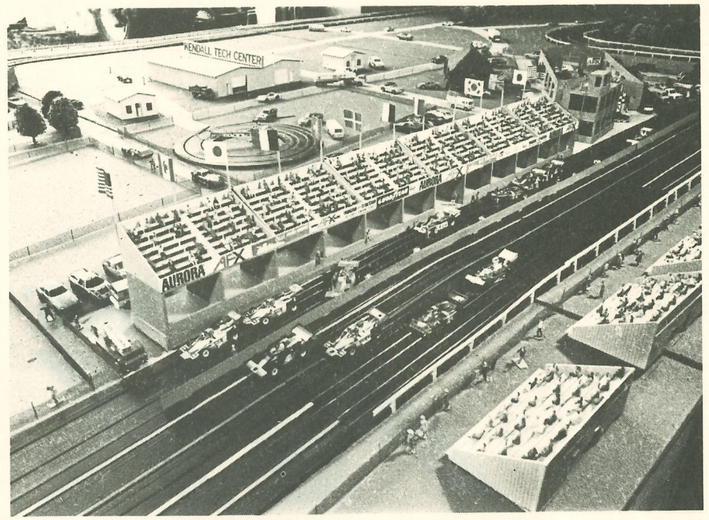
"THE CLOSEST THING TO REAL RACING"

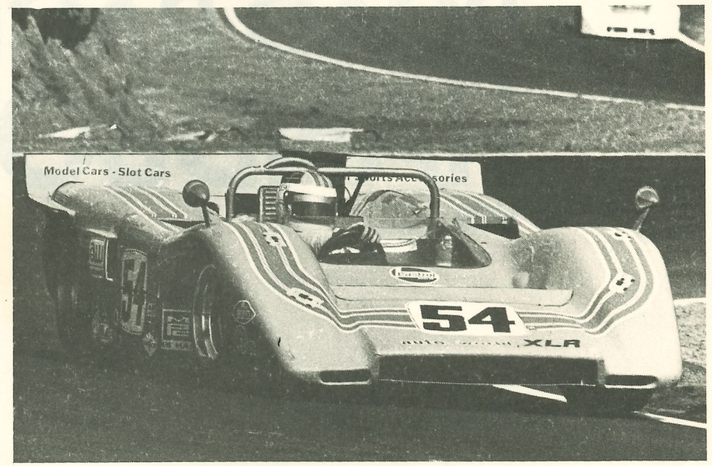
Here are the world championship cars, racing worldwide, that you can put in your pocket. What started out in the late 50's as a little "toy buzz car" that ran on a tiny track about HO scale (AFX scale is about 1/64) at the Briton Toy Show in England, grew into a HOBBY SPORT that is now practiced worldwide.

AURORA AFX is the system that grows and grows. Basic cars and sets are available worldwide, and cars, accessories, track and parts are plentiful. While the cars are easy to maintain and race, they are the most advanced of their type. They are almost exact copies of the real cars, the only deviations from scale are those required to fit the tiny chassis. As real road racing tracks were built (many original tracks were highway roads blocked off for racing) banked turns, pits, guardrails became part of every track. Capturing the real race atmosphere in miniature, Aurora designed and produced the various parts so that racing on four lanes, in banked turns, and down long straights would be possible. Aurora makes it possible for you to design and build a replica of almost any major raceway.

Aurora's design group built and raced a series of special cars secretly. Following real races, they studied real racing cars and duplicated them in miniature. These cars were known as Aurora Factory Experimentals. When Aurora wanted to shorten the name MODEL MOTORING, they chose the trademark AFX which was short for Aurora Factory Experimentals. Many design features in these special cars are used in the new series of AFX cars. Speed, performance, looks and collectibility made the new cars instant winners with hobbyists everywhere.

As clubs and hobbiests chose AFX cars to race 6 Hour Races and 24 Hour World Record attempts became commonplace, pit stops and driver changes added more excitement to the racing. In order to keep score, Aurora designers developed the AFX Electronic LED lap Counter and Lap Timing System. Today, Aurora AFX Road Racing is





"the closest thing to real racing" you can put on a tabletop.

This handbook has been assembled by many professional racers. It covers the cars, the track, the electrical circuits. It shows you how to expand your set into a full fledged road course including scenery, tells you how to race to win, how to organize a club and how to enjoy the hobby of table top road racing to its fullest!

The AFX Road Racing System is designed for the beginner as well as the expert. This handbook can make an expert out of a beginner, as it answers hundreds of questions. AFX is a racing system that grows and grows and never becomes obsolete.

Having been involved with real racing and model racing for many years, it's been my pleasure to work with the people who wanted to share their knowledge and interest with you and their love for racing cars, big or small.

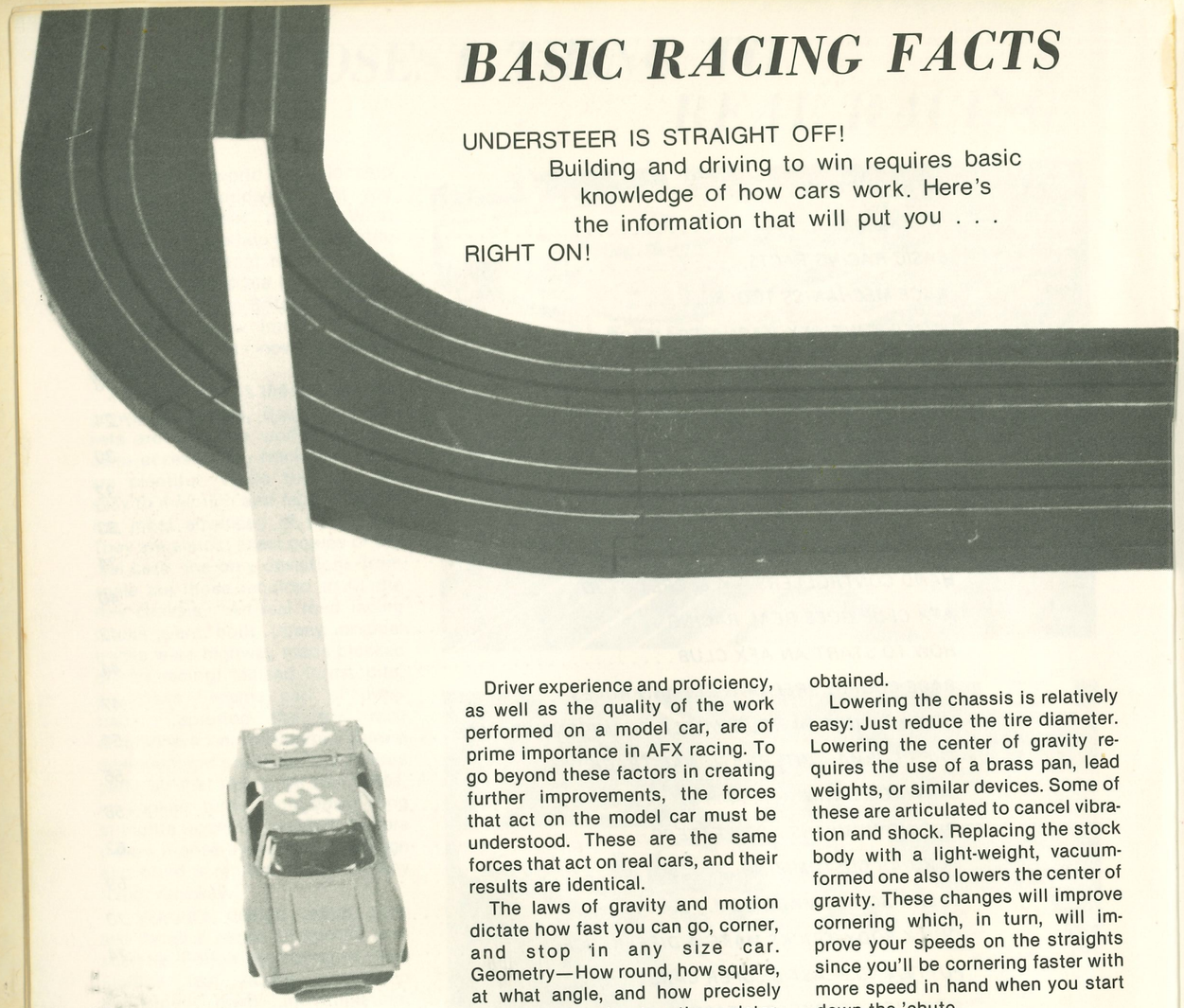
Oscar Koveleski
Editorial Director
President, Auto World Inc.

Edited by
Phil Jensen

BASIC RACING FACTS

UNDERSTEER IS STRAIGHT OFF!

Building and driving to win requires basic knowledge of how cars work. Here's the information that will put you . . . RIGHT ON!



Driver experience and proficiency, as well as the quality of the work performed on a model car, are of prime importance in AFX racing. To go beyond these factors in creating further improvements, the forces that act on the model car must be understood. These are the same forces that act on real cars, and their results are identical.

The laws of gravity and motion dictate how fast you can go, corner, and stop in any size car. Geometry—How round, how square, at what angle, and how precisely everything works together—determines how effectively you can reduce friction and take advantage of these laws. Acceleration and speed are dependent on torque and horsepower at the driven wheels; deceleration (braking) depends on the weight of the car and the resistance of the motor.

For racing, the lower the center of gravity the better (this means that the greatest part of the car's weight should be down close to the track). A low center of gravity improves cornering; it also reduces weight transfer during acceleration and braking. The lower the chassis, the better, to minimize drag caused by air getting under it. Remember, too, that a lower body profile reduces frontal area and decreases air resistance so higher speeds can be obtained.

Lowering the chassis is relatively easy: Just reduce the tire diameter. Lowering the center of gravity requires the use of a brass pan, lead weights, or similar devices. Some of these are articulated to cancel vibration and shock. Replacing the stock body with a light-weight, vacuum-formed one also lowers the center of gravity. These changes will improve cornering which, in turn, will improve your speeds on the straights since you'll be cornering faster with more speed in hand when you start down the 'chute.

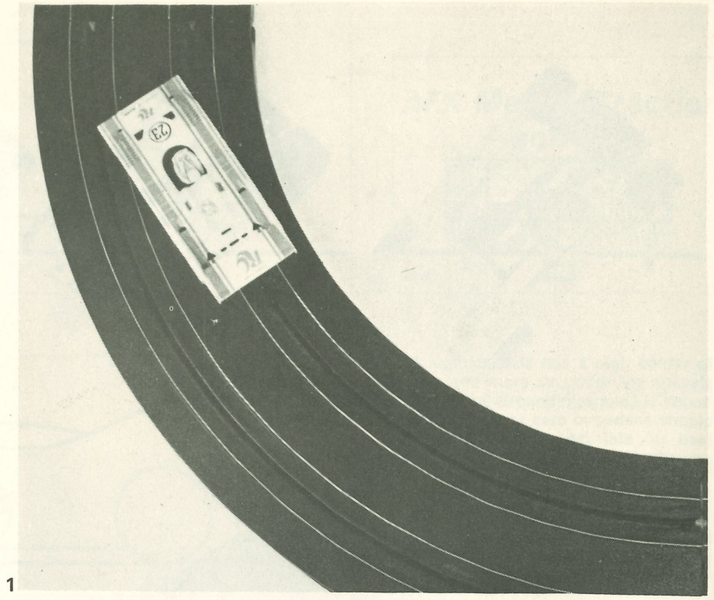
To further improve cornering speeds, chassis balance must be understood. Proper balance between "oversteer" and "understeer" is essential to fast cornering and the bonus it gives—faster speed on the straightaways.

These two terms, "oversteer" and "understeer", are much used in real racing to describe car handling into, around, and out of corners. In real racing, engine and fuel placement; tire pressures, widths, and compounds; sway-bar settings; spring rates; and aerodynamic devices; all are used to balance oversteer and understeer to optimize car handling.

To achieve proper balance of our model car, we must use other methods. Before you begin experimenting, however, make sure your track is clean and the slot is clean, or your tests won't be conclusive.

1. A car that understeers tends to lose traction at the front end, refusing to follow the curve and going straight off the road. In slot racing, this usually means the car "deslots". There are ways to minimize this condition.

2. Oversteer is the opposite of understeer. Here, the rear end loses traction and slides toward the outside of a turn. If oversteer is too great, real cars usually spin toward the inside of the turn. In slot cars, you lose forward speed.



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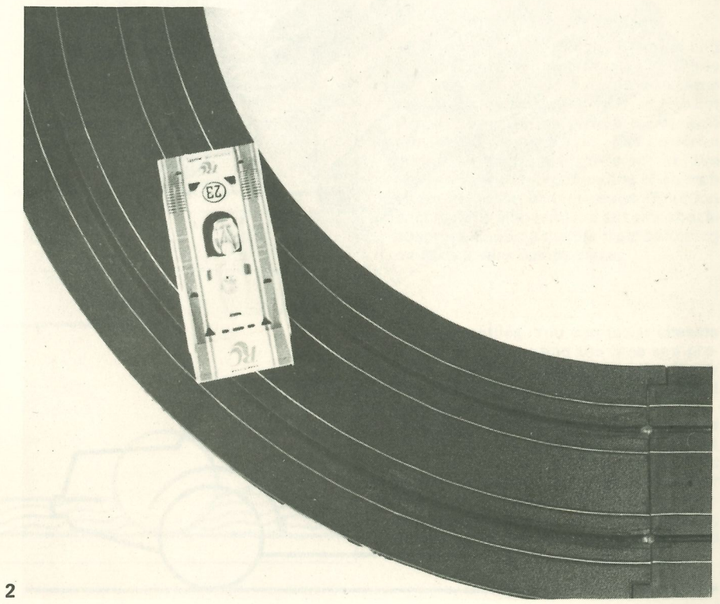

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Understeer is unwillingness of a car to turn into and follow through a corner. Although, in theory, the guide pin should lead the AFX car's front end around the turn, chassis understeer may be so great as to cause deslotting: The car simply won't go around the corner at the desired speed. Several things may cause this disturbing situation. When you accelerate the motor, it develops a torque reaction that causes the chassis to lift in front—sometimes enough to lift the pin right out of the slot. It also happens when you go into a corner much too fast. Or, it may be caused by putting wider or stickier rear tires on the car to get a better 'bite', thus increasing torque lift of the chassis. In stock car terms, understeer is known as "pushing" or "plowing".

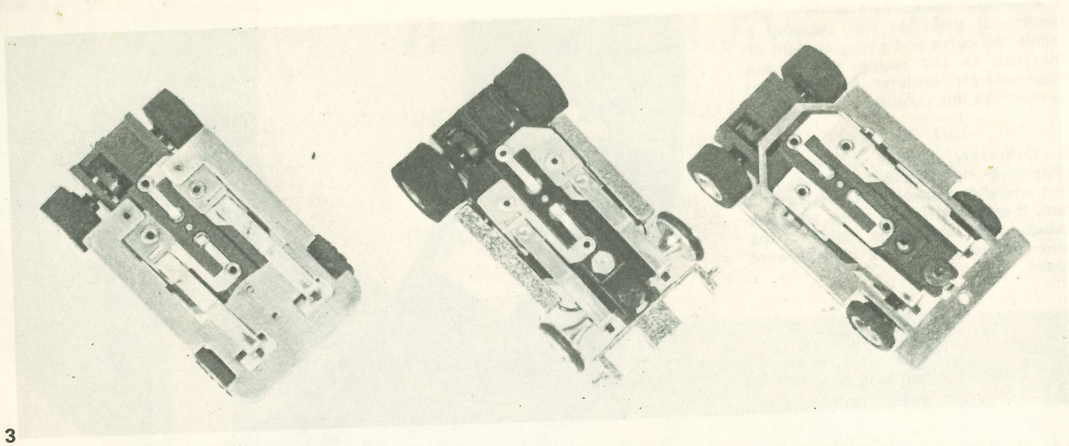
The solution to excess understeer or deslotting is to add weight at the front of the chassis to keep the guide pin in the slot. Remember, tho', that adding weight reduces acceleration as the motor must do more work to push the car along the track.

For faster racing, the idea is to get your front end to stick well so you can corner faster and—as we've said above—exit from the turn with more speed available for the straightaway run, thus covering more distance per second than your competition. If too much weight is added to accomplish this, your acceleration will suffer, thus cancelling out the advantages of faster cornering.

Oversteer refers to the behavior of the car's rear end. If a car habitually slides toward the outside of a turn, it is oversteering. If this tendency can be overcome, the car will lap the track more rapidly since so much of the motor's performance is wasted by spinning the tires. Also, exiting from a turn with the car sideways isn't the fastest way to go down the 'chute'. Ask any drag racer or racing driver. It looks "hairy", but it's not the winning way.

While there are a number of tricks you can use for correcting understeer, such as reshaping guide pins and pickup shoes, only two things will reduce oversteer. The first is adding weight, the second is using a wider or stickier tire. If these are overdone, your front end will start plowing again and deslotting, so a delicate balance must be achieved for the greatest success.

The 'ground-hugging' characteristics of a car can be improved dramatically by installing separate



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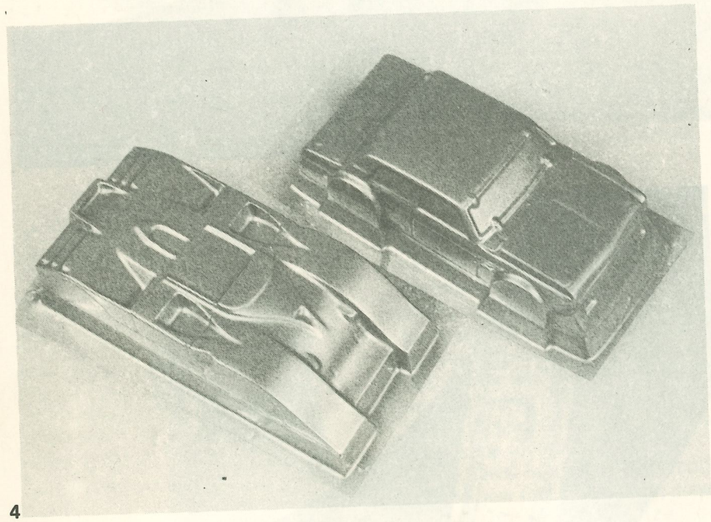

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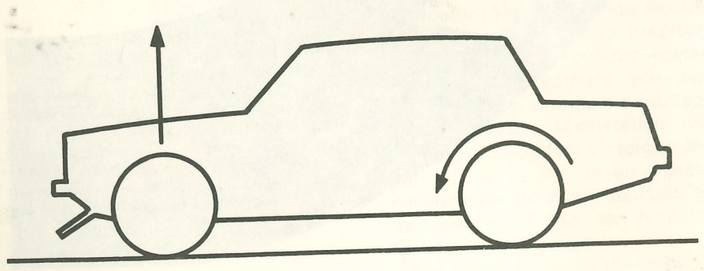

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magnets in the chassis or lowering the motor magnets as in the AFX 'Magna Traction' or G-Plus cars. In either case, the magnets are attracted to the steel conductor rails imbedded in the track, providing a strong down-force that improves traction and handling.

Increasing power will change the situation as more weight can be added front and rear to control balance without cutting acceleration drastically. Heavier cars will stop more quickly, although that may seem to be a paradox. More power and heavier cars require larger powerpacks and controllers, which generally create more heat and require more expensive components—and a higher cost of racing. In model car racing, just as in real car racing, the objective is to select a class that you want to race in because it's the one you can afford or like best. Improve your car until it's running with the fastest in the field. Balance it, because that makes it easier to drive. In a way, your car then becomes like a finely tuned musical instrument!

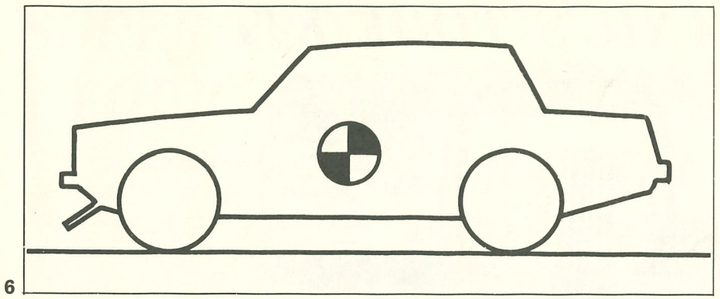
3. Brass pans, articulated pans, and weights all lower the center of gravity while adding weight front or rear to help balance oversteer and understeer. Some articulated and iso-fulcrum pans are mounted 'loose' to cancel out track bumps and vibration.

4. Lightweight, vacuum-formed bodies decrease body weight and automatically lower the center of gravity. They are usually of lower profile, thus reducing wind resistance.

5. Acceleration forces try to lift the car's front end up and out of the slot, due to inertia, tire resistance, and axle gear 'wind-up' when you "get on it". Remedy: Add weight to the front end. There's more, tho'—see text.

6. Sedans and stock cars have a high center of gravity. This means that the weight is higher than that of a low-profile racing car, so acceleration, deceleration, and centrifugal forces (in cornering) produce more weight-transfer. This 'rocking' or shifting balance is hard to predict for out-and-out racing slot cars.

7. A low center of gravity is typical of racing cars, designed for all-out speed and cornering. In fact, the lower the center of gravity, the better. Racing bodies also have less frontal area, and less air-resistance and higher top speed for a given amount of horsepower.



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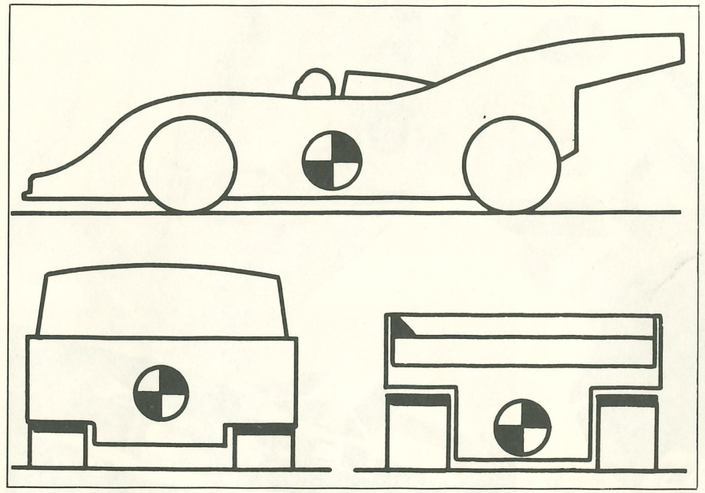

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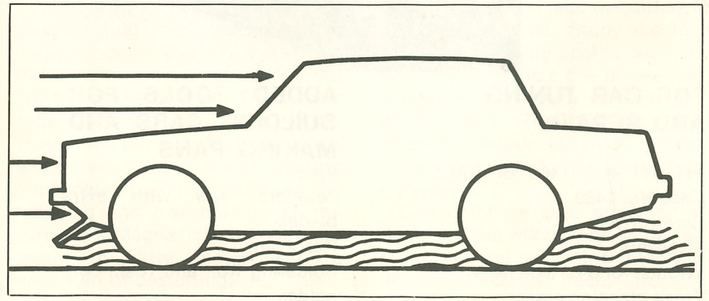

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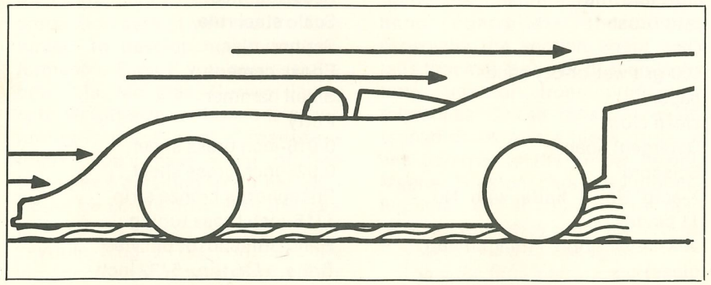

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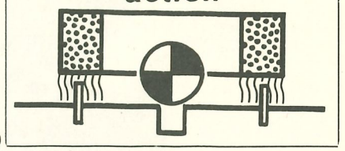
AFX Magna Traction action



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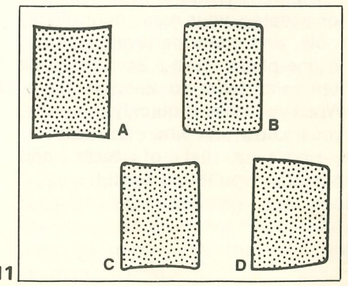
8. A high chassis has a high center of gravity and more air under the chassis when racing. Ground clearance is important: Even stock cars or sedans should be kept as low as possible for best handling.

9. A low chassis gives a low center of gravity, less air under the chassis, and a low profile. All these lead to better handling and higher speeds.

10. The Aurora AFX Magna Traction and G-Plus cars employ the motor magnets to create a strong down-force. The same steel rails imbedded in the track that supply power to the pickup shoes also provide magnetic action. The powerful motor magnets are lowered in the chassis to within thousandths of an inch above the rails; thus magnetic attraction occurs. This also tends to act as a shock-absorber, keeping the car from bouncing on even a very bumpy track.

11. Tire profiles. You can lower chassis height by run-sanding the tires and profiling them at the same time. Every builder has his own favorite 'tweak', but here are the basics:
(A) is a stock tire, out of shape, out of round, needing run-sanding. (B) edges have been sanded off to eliminate flips while cornering. (C) Hollow-center shape, preferred by some who use super-soft sponge tires. (D) an unstable design, since the taper causes oversteer and flips.



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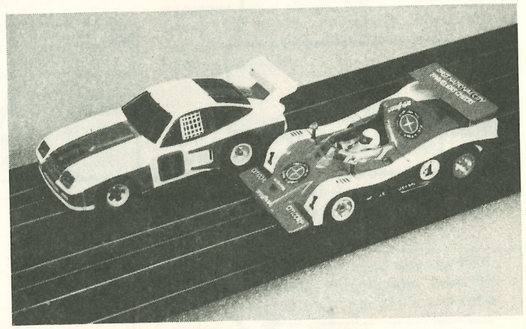
RACE MECHANIC'S TOOL KIT



AFX racing is just like real racing in many ways, and one of these is the need for tools to work on your cars. Exactly what tools you'll require depends on whether you wish to keep your stock AFX cars in perfect tune, or undertake more ambitious projects like rebuilding cars or designing your own. In either case, take care of your tools, and they'll take care of you!

The PIT KIT is the ideal tool box for keeping your cars, controllers, tools, and spare parts all together in one place. Find a spot for each item and learn to keep it there. When you need it quickly in a race, you'll know just where to reach!

Here's a list of tools and materials you'll find useful:

FOR CAR TUNING AND REPAIR:

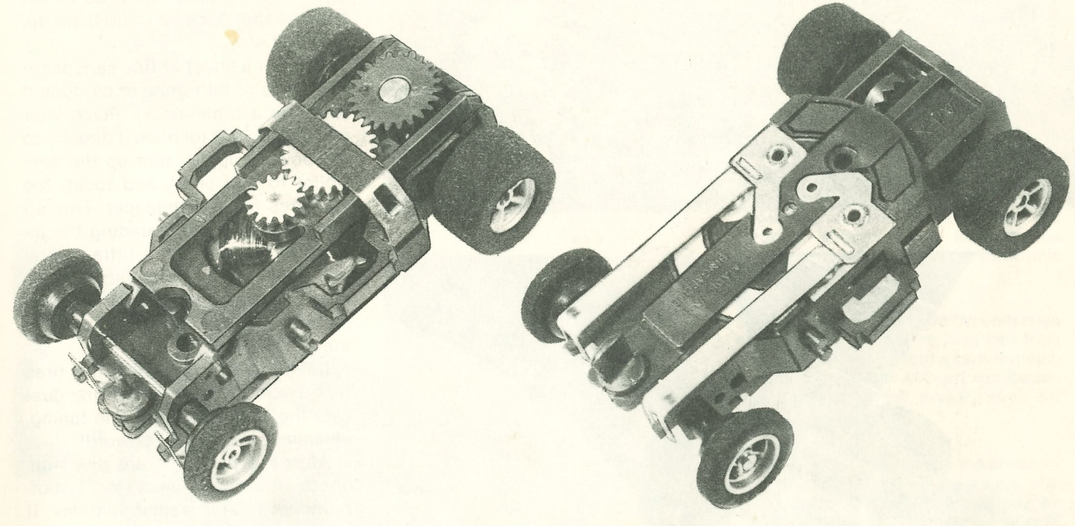
PIT KIT No. 1469 or RACE Case No. 1489
Screwdrivers
Tweezers
Wrench for 0-80 axle nuts
Track-cleaning eraser
Diagonal cutting pliers
Jewelers' file
Stiff brush
Oil
600-grit wet-or-dry sandpaper
clean cloth
Detergent soap
Scissors
X-acto No. 1 knife with No. 11 blades
Jewelers' loop (magnifying glass)

ADDED TOOLS FOR BUILDING CARS AND MAKING PANS

Vise
Jewelers' saw with extra blades
Razor saw
Soldering iron and rosin-core solder
Noncorrosive soldering flux
Assorted files
Scale steel rule
Scriber
Epoxy cement
Small hammer
Putty
0.016-inch brass sheet
0.025-inch brass sheet
Phosphorus bronze strip
1/16-inch brass tubing
Hand drill and/or pin vise
Drills, 1/16 thru 5/32 inch

SUPER TUNING YOUR AFX magna-traction™ CARS FOR PERFORMANCE

With motor magnets lowered in the chassis, these cars give you better, more controllable handling and less deslotting



The AFX Magna Traction cars follow the same basic design as the long line of dependable Aurora AFX cars, but have several new features that AFX racers should know about. The magnets are thicker and extend almost to the bottom of the chassis. Thus, their lower ends are very close to the steel rails imbedded in the track and are attracted to them, creating a magnetic 'pull' that improves the handling and road-holding of the cars. AFX Magna Traction cars are easier to drive faster with a minimum of deslotting.

Fresh from the package, a stock AFX Magna Traction car is faster than a standard AFX car but, like all production cars, it will require 'fine tuning' to develop maximum performance. Even if you purchased a new Lola, McLaren, Gurney Eagle, or other full-size car from one of the racing machinery manufacturers, you'd have a lot of fine tuning and detailing to do before it would be competitive with the cars used by the factory teams.

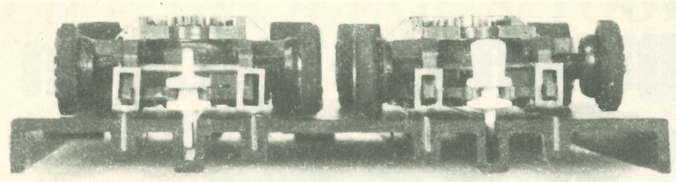
While Magna Traction cars are similar in design to standard AFX types, and many of the parts are interchangeable, certain techniques peculiar to their use of magnetic force require different tuning procedures. Study the text and accompanying photos carefully so you'll recognize the differences and learn which parts will work and which won't. The main chassis, magnets, motor brushes, pickup shoes, and pickup shoe springs are different.

One point we keep stressing is that your cars will only be as fast as the power you get to the track will let them! Clean track, properly assembled, is even more important with the Magna Traction cars. Study the chapters on track and hand controllers thoroughly, especially the section about steel rails that may pop out of the plastic from use or from production tolerances. These rails are easily tapped down with a block of wood and hammer to the proper height. Magna Traction cars are 'ground-huggers', and if any rails are popped, your car may stick to them as if it were glued to the spot!

The AFX high-performance track has deep slots, so super speeds may be obtained. AFX cars manufactured after 1971 are fitted with a reversible guide pin that snaps in and out of place. Use the deep-slot blade for the highest speeds on the later track, or reverse the guide and use the pin when racing on track made before 1972. Make sure the guide runs freely in the slot and has no burrs to slow you down.

One simple trick to improve road holding is to use the STEEL GUIDE PIN used in the G-Plus cars. The "reverse" taper and minimum size diameter helps reduce friction. It is available from your Aurora Service Center and slips right into the chassis without any modification. Part No. 8915.

One of the easiest and yet most significant improvements you can make on your stock AFX Magna Traction cars is to run-sand the rear tires. These are cut from sponge rubber and have high spots that cause wheel hopping and poor handling. 'Run-sanding' is the only way to make sure the tires are perfectly round.



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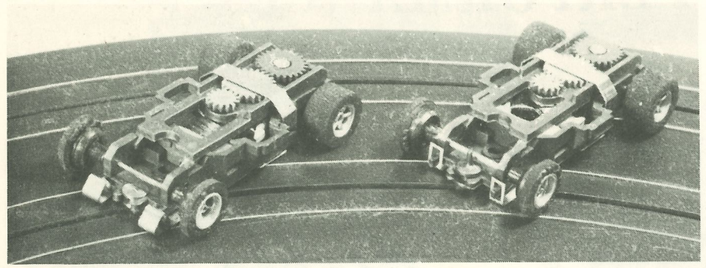

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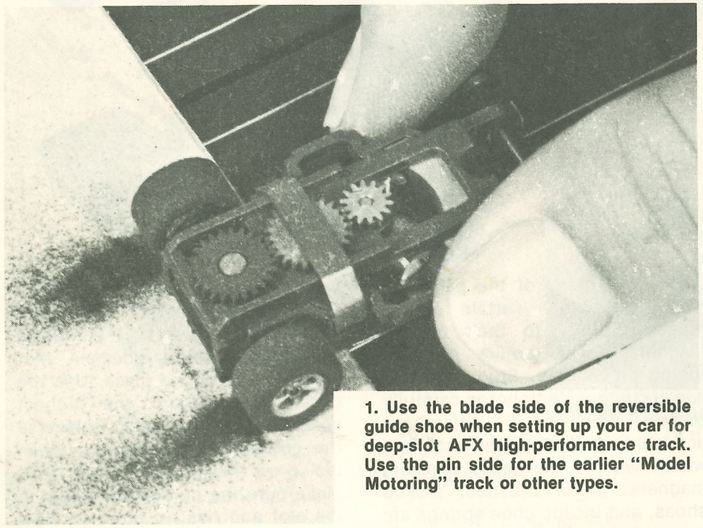

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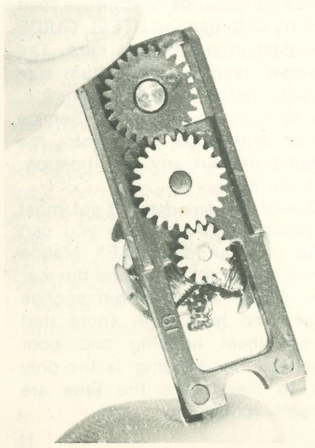
1. Use the blade side of the reversible guide shoe when setting up your car for deep-slot AFX high-performance track. Use the pin side for the earlier "Model Motoring" track or other types.



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2. Another simple trick to improve road-holding in your Magna-Traction cars is to substitute the steel guide pin used in the G-Plus cars. It has a "reverse taper" that helps keep the car from de-slotting. It's available as Part No. 8915 from your Aurora Service Station or hobby dealer.

3. "Run-sand" your rear tires to true them for smooth, fast running. Some drivers reshape tires, but be careful! Too much sanding will let your chassis scrape the ground. To clean your tires and keep them clean, run them over the sticky side of masking tape. It works wonders!

4. Remove the gear plate by prying off the gear clamp with a small screwdriver. Lift plate off carefully, as two tiny motor brushes live beneath the armature.

The first step is to remove the body by holding the rear end with one hand and pulling the side of the body with the other. Lay the body aside, then remove the rear tires and spread a thin coat of contact cement inside both of them. Next, scrape the chrome off the rear wheel hubs and apply contact cement to the rims. Replace the tires and let the cement dry for at least 30 minutes. The cement bonds the tires to the hubs so that once you true them up, they will stay.

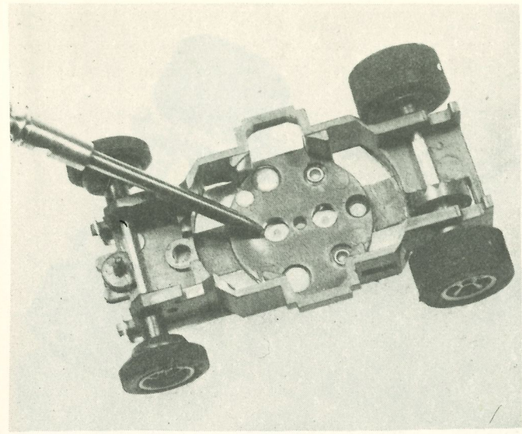
Cement a sheet of fine sandpaper to a piece of thin wood or cardboard (such as a tablet-back). Place your car on the track (or hook it directly to the power supply), turn up the controller to 'full bore', and touch the rear tires to the sandpaper. True up the tread surfaces, rounding the inner and outer edges a little to prevent flipping, but **don't sand too far** or you'll reduce tire diameter to the point where the chassis drags on the track rails.

IMPORTANT: Run-sand the tires first because you'll have tire dust over the chassis and, in fine tuning, cleanliness is the watchword!

After the rear tires are trued up, check the front ones for out-of-roundness and replace them if necessary. The stock Aurora front tires are adequate as they are neither so hard that they amplify vibration nor so soft that they 'scrub' and slow you down.

In model car racing, as in any type of racing, you must get to know your machine inside and out. Practice taking it apart often enough so that you can put it together in the dark; when the time comes that you may have to do this in a race, you'll win!

With the body removed, spin the rear tires and note that three gears revolve. Look under the rear gear and you'll see two additional ones underneath that drive the rear wheels. This is a lot of gearing for a small race car, and means plenty of drag. While the gears are made of Nylatron, a self-lubricating plastic, a tiny drop of oil in a few spots (as indicated on the chart) will reduce drag. Don't use more than a tiny drop, however, as oil spreads readily and has the bad habit of collecting dust, dirt and fuzz. All of those will only slow you down! The Aurora X2C AFX Plus synthetic oil with the micro-capillary tube dispenser is the ideal racing oil, packed in an oiler that permits applying it sparingly!



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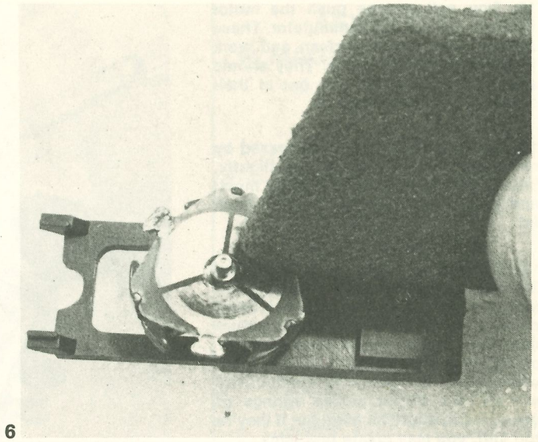

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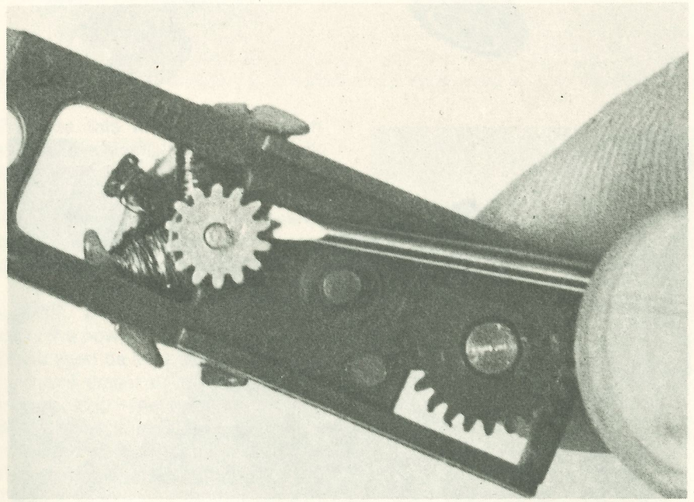

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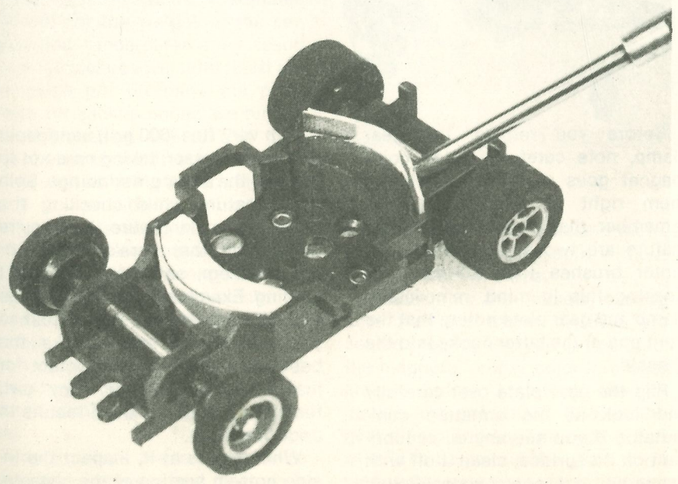

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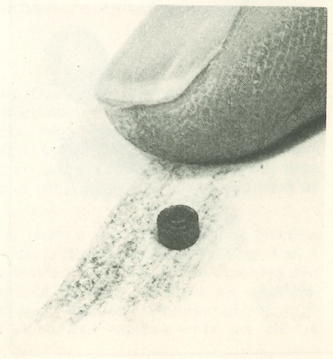
5. The AFX Magna Traction chassis has larger magnets and special brushes. The magnets extend down through the chassis and attract the steel track rails for better road-holding.

6. The commutator disc on the underside of the armature must be kept free from dirt and oil. Clean it with a carborundum track eraser, 500- or 600-grit sandpaper. If you use a pencil eraser, wash off residue.

7. If you're going to remove the armature or install an AFX Plus Quadra Lam, proceed carefully, A special tool may be made from a wooden block, as shown in another chapter.

8. Shim the magnets closer to the armature with masking tape or thin card stock to increase magnetic field and motor power. A good trick, and easy to do.

9. Clean the motor brushes carefully. They're a carbon compound and very soft. Rubbing them on a clean sheet of paper seems to work best. If the brushes are worn, replace them or you'll rob the motor of available power. Also, replace any brushes that are oil-soaked. It is impossible to get the oil out because the brushes are porous.



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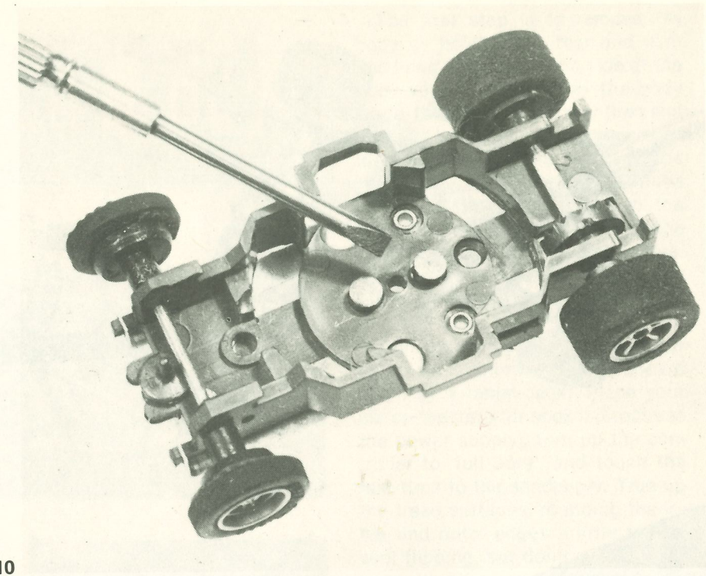
10. Tiny coil springs push the motor brushes against the commutator. These springs must be kept clean and work freely in the brush tubes: They should extend almost all the way out of their holes for best performance.

11. Brush tension may be increased by stretching the tiny coil springs slightly, but be careful: Stretch them too much and you'll never get the armature back in!

12. The pickup shoes on AFX Magna Traction cars differ from those on the standard AFX cars and are not interchangeable. Clean them with a carborundum track eraser, pencil eraser, or 500 or 600 grit sandpaper. Replace them when worn, as electrical conductivity will be lost. Stiffer pickup springs of equal length might be tried, but if they're too stiff, you may create problems.

13. These are the gears, actually five since one of them has two sets of teeth. All must be perfectly round and not warped. Gears create much drag and must operate with as little friction as possible. Check carefully to make sure none of them bind when installed.



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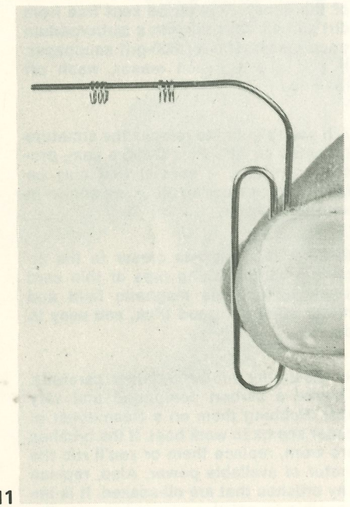

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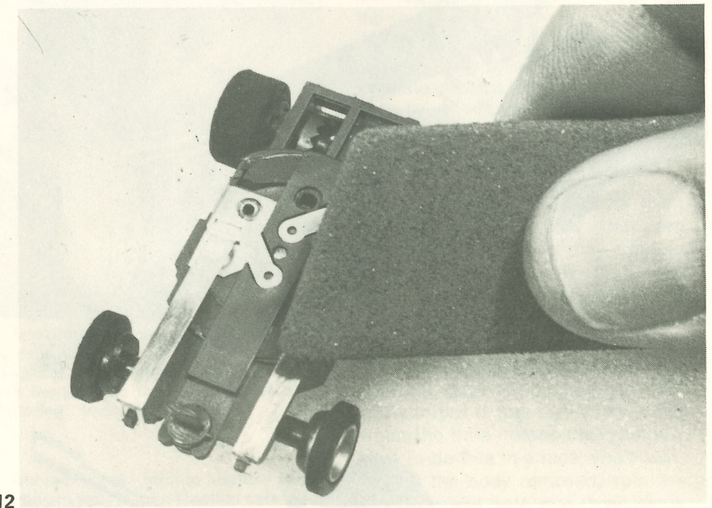

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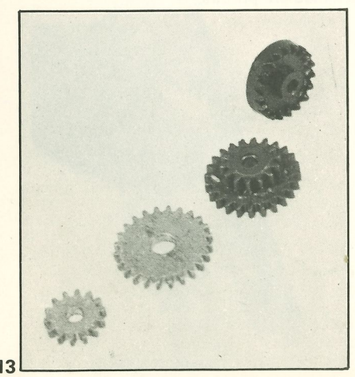

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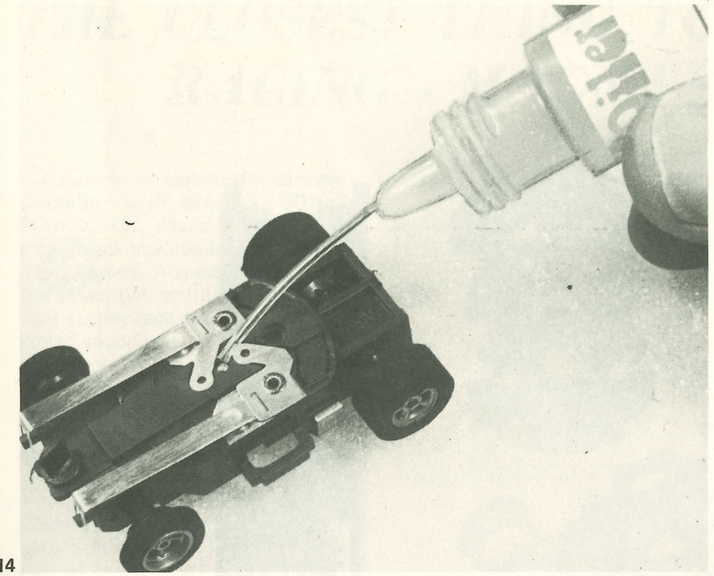
Before you remove the gear clamp, note carefully which color magnet goes where so you'll get them right in reassembly, and remember that underneath the armature are two small, cylinderical motor brushes that will fall out. Keeping this in mind, remove the clamp and gear plate noting that the front end of the latter hooks into the chassis.

Flip the gear plate over carefully and look at the armature commutator. If you see any oil or lubricant on its surface, clean it off with tissue and hot, soapy water. Polish it with very fine (600 grit) sandpaper or a pencil eraser, taking care not to damage the armature windings. Spin the armature while checking the gears and making sure that they're not warped, that there's no flash or dirt on them, and that they aren't binding. Examine the motor brushes and clean these as well. Brushes and commutator must make the best possible electrical contact for maximum performance. Any dirt, fuzz, or oil between them results in poor operation.

While you're at it, inspect the inside bottom section of the chassis.



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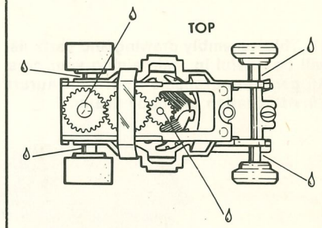
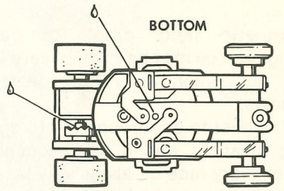
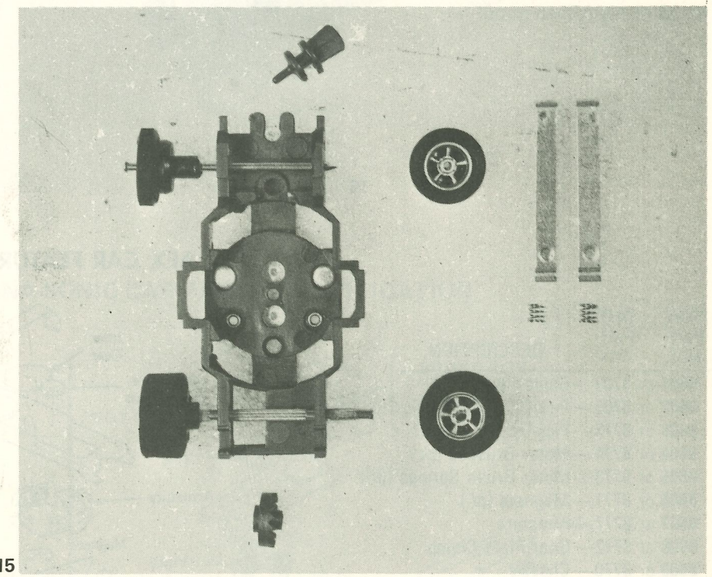
AFX CAR w/ MAGNA-TRACTION

OILING INSTRUCTIONS







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Be sure this area and the brush springs are clean. If the springs lack tension, you can stretch them or install replacements. Don't overdo the stretching, however, as excessive brush tension will only create new problems.

Now, study the bottom of the chassis. Since the pick-up shoes carry the power from track to motor, these must be kept clean and bright (a pencil eraser or a carborundum-impregnated type track eraser will do the job) and must be straight and not worn out. Some drivers prefer to file them with a flat jewelers' file. The small coil springs that provide shoe tension may be stretched to give more pressure, but if adjusted too stiff for the weight of the car, deslotting (understeer) may result since the pickups will tend to lift out the guide pin. Examine the point where the pickup shoes are hinged into the chassis plates. This joint must be clean and free from dust or lint as well as being in perfect alignment to provide good contact. Notice how the shoes are connected to the metal plates and are attached to the motor brush springs. This is the route along which electricity flows from track to commutator, and perfect cleanliness is essential all the way to assure good electrical connections that will bring the armature all the volts and amps it can use!

Finally, check the axles to make sure they're straight and clean with no fuzz or hair wound around them. Note how freely they spin without the gear-train in place.

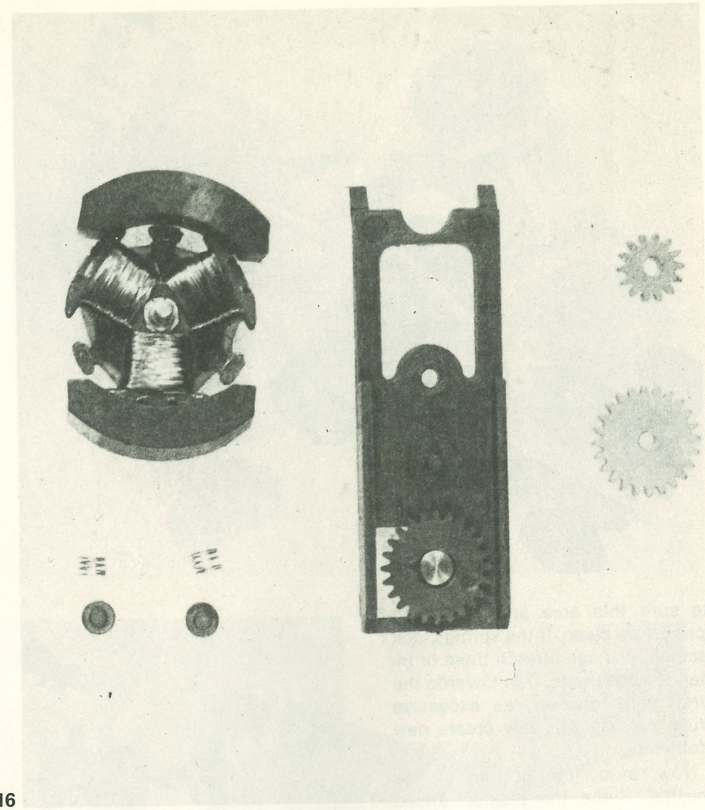
Reassemble the chassis, making sure that the motor brushes are seated properly and you've installed the magnets (proper color in proper place!) before installing the armature and gear plate. Slip on the gear clamp and try turning the rear wheels to be certain the gears don't bind. After assembly, don't mistake

14. Overoiling can be dangerous! Too much oil or the wrong kind can ruin your car. Highly recommended is Aurora's X2C synthetic oil with micro-capillary tube dispenser. You can put a tiny drop of synthetic oil right where you want it!

15. Here's an AFX Magna Traction chassis disassembled. Consider it as a precision miniature racing machine that should be kept as clean as possible, always. Parts are engineered to last a lifetime, but replacements are always available.

16. The AFX Magna Traction 'motor package' disassembled. Armatures and gears are interchangeable with AFX parts. This tried and proven motor has raced millions of miles, all over the world!

17. This assembly drawing and parts list will be useful in maintaining your cars. All parts are available from your Aurora Service Station or hobby dealer.

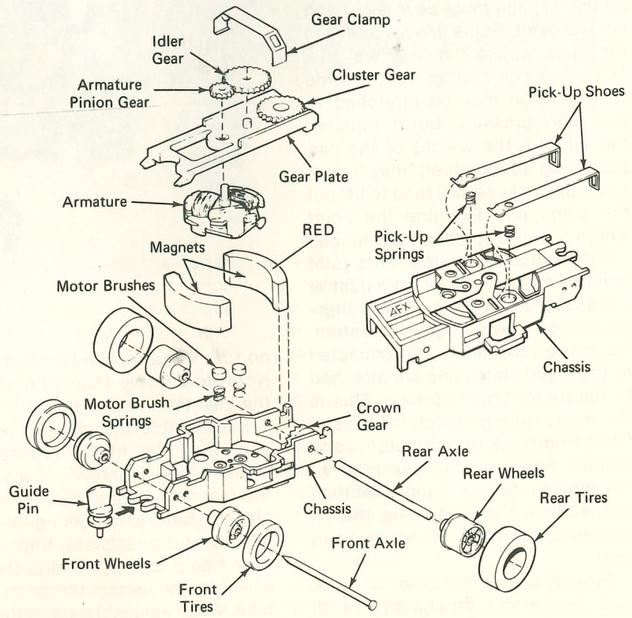


magnetic field 'drag' for gear binding: You may be able to feel a little 'pull' when you rotate the rear wheels.

It's best to go through the foregoing cleaning and oiling sequence after every race or, at the very least, after each two hours of operation. Oil only according to the chart, remembering that too much oil will do more harm than good!

NEW Part Nos.	OLD Part Nos.	DESCRIPTION
8601	or 8703	— Guide Pin
8602	or 8705	— Pick-Up Shoe Springs (pr.)
8603	or 8775	— Pick-Up Shoes (pr.)
8604	or 8774	— Motor Brushes (pr.)
8605	or 8773	— Motor Brush Springs (pr.)
8606	or 8771	— Magnets (pr.)
8607	or 8777	— Armature
8608	or 8772	— Gear Plate Clamp
8609	or 8770	— Chassis
8610	or 8711	— Gear Plate and Cluster Gear
8611	or 8712	— 14 Tooth Idler Gear
	8713	— 24 Tooth Idler Gear
	8714	— 15 Tooth Crown Gear
8612	or 8715	— Front Axle
	8718	— Rear Axle
8613	or 8716	— Front Wheels (pr.)
	8719	— Rear Wheels (pr.)
8614	or 8717	— Front Tires (pr.)
	8720	— Rear Tires (pr.)

AFX CAR FEATURING MAGNA TRACTION



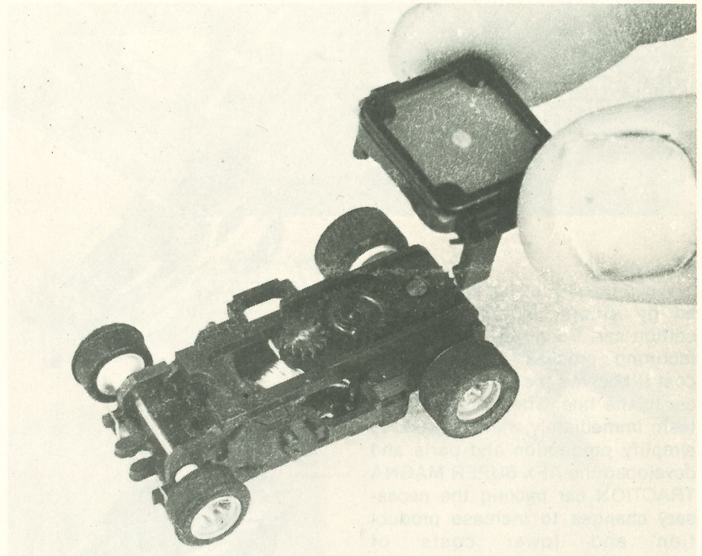
THE CLOSEST THING TO REAL RACING - MAGNA-SONIC SOUND

A number of Aurora AFX cars are available with MAGNA SONIC SOUND. The sound system is a small black box, mounted on top of the gearplate. A special gear drives the sound pin, emitting a noise not unlike a tiny race car. It creates this racing sound while running.

Because of the size and location of the sound box, it does not fit inside all of the bodies nor is it available separately. Therefore, the selection of cars is limited to body styles like stock cars and GT cars.

The SOUND BOX is specially tuned to each car. Therefore, for best sound quality do not interchange the SOUND BOX with any other car. Many parts of the MAGNA SONIC car are interchangeable with other AFX Magna Traction cars. The exploded drawing and parts listed below identify these.

NOTE: Should you want to race without the SOUND BOX, merely remove it and install a gear clamp in its place. (Part No. 8608 or old number 8772).



AFX MAGNA-SONIC CAR PARTS IDENTIFICATION

NEW Part Nos.	OLD Part Nos.	DESCRIPTION
8601	or 8703	— Guide Pin
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	8713	— 24 Tooth Idler Gear
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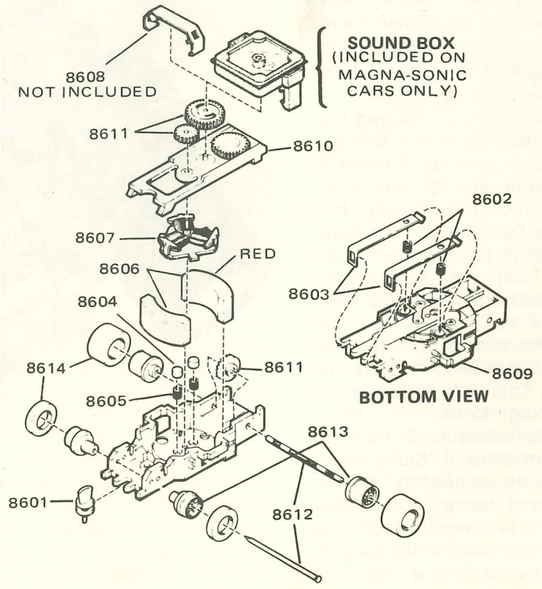
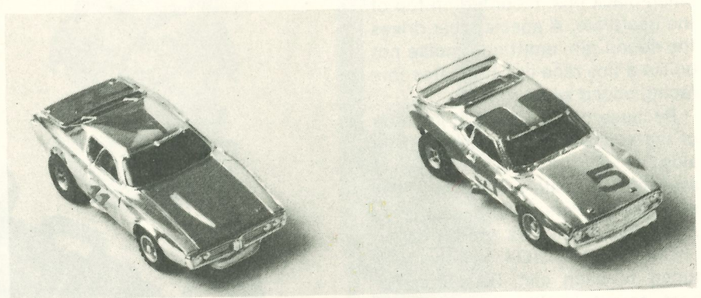
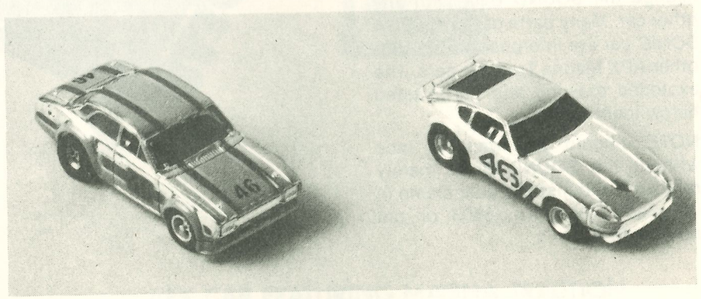
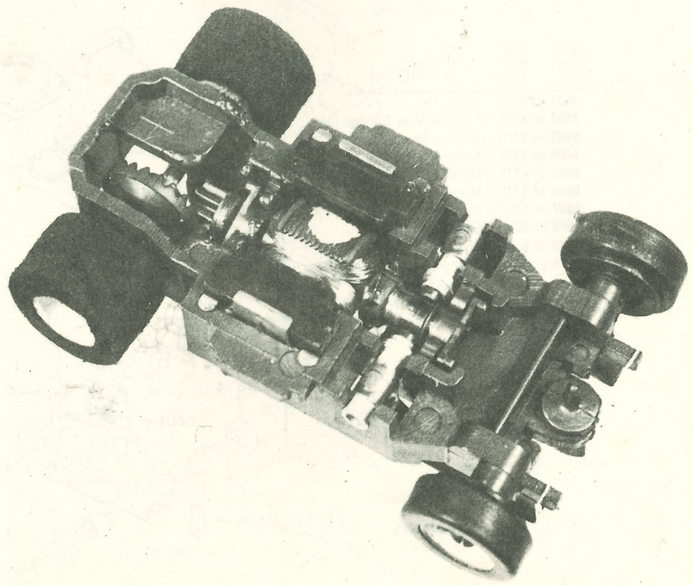
	8718	— Rear Axle
8613	or 8716	— Front Wheels (pr.)
	8719	— Rear Wheels (pr.)
8614	or 8717	— Front Tires (pr.)
	8720	— Rear Tires (pr.)



SUPER TUNING YOUR AFX SUPER magna-traction™ *CHASSIS*







When the G-Plus car was designed by Aurora, it was a limited edition car. Because of the manufacturing process and assembly cost it became the most expensive car in the line. The Aurora design team immediately went to work to simplify production and parts and developed the AFX SUPER MAGNA TRACTION car making the necessary changes to increase production and lower costs of manufacturing.

The objective was to make a narrower, lower chassis so that scale replica models would more closely resemble the real cars. Therefore, the design closely follows the G-Plus car and many bodies are interchangeable. The two-gear pinion and ring gear system allows less friction. Therefore more power and RPM's for faster acceleration and racing, along with less current draw from the power supply.

Fine tuning the car follows the same procedure as in the G-Plus, but since some parts are different it requires some special attention. For smooth racing, fun racing, the AFX Magna-Traction cars are hard to beat. To get the maximum performance from the AFX Super Magna Traction cars, like the G-Plus cars you'll have to make sure your track rails don't extend more than .015 of an inch above the track itself. This is to keep the car from "sticking" to the rails. Also, it's a must to make sure all the track joints are smooth and "bump free". This is accomplished by careful assembly and tapping down the track rails with a wood block and hammer as illustrated in the chapter on track assembly and wiring.

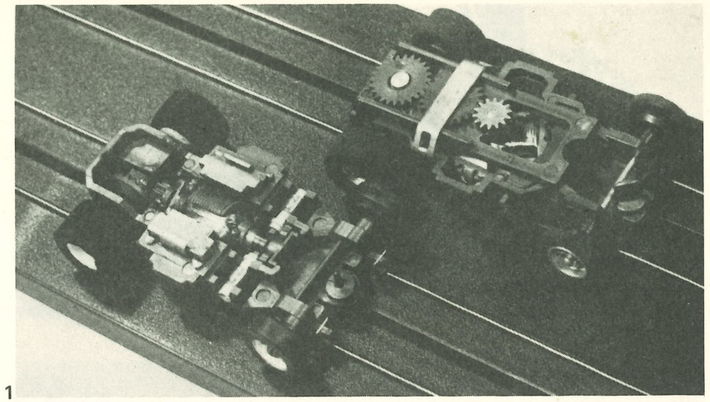
1. The AFX SUPER MAGNA TRACTION CHASSIS (left) is an in-line design. The AFX Magna Traction (right) a pancake design. Both chassis handle well, however, the lower, narrower inline design is more adaptable to wider range of body styles, including open wheel cars.

2. The motor brushes are mounted in tubes that act as 'heat-sinks', coil springs to maintain tension. Brushes should extend about 1/8 inch from tubes for best performance, and should be replaced when worn.

3. Faster 'break-in' is obtained by filing the face of each brush with half-round jewelers' file so it seats on commutator. Put both brushes in the brush tube to hold them as you file.

4. Clean and polish commutator frequently with 500- or 600-grit (fine) sandpaper, or carborundum track eraser. Keep commutator free from oil, dirt, and carbon from motor brushes.

5. Clean out grooves between commutator segments with Xacto knife or sharp screwdriver. This removes carbon deposit left by motor-brush wear and any residue left from polishing. DON'T damage armature windings or segments!



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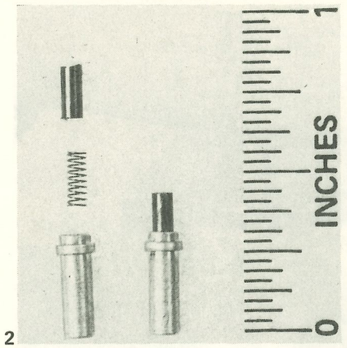

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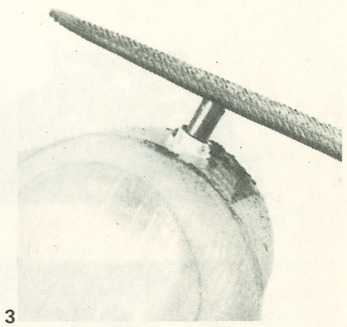

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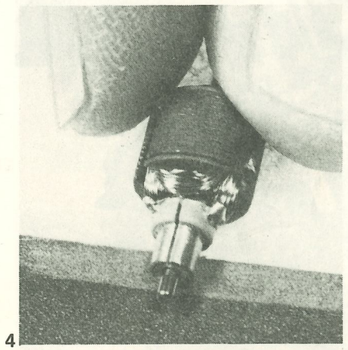

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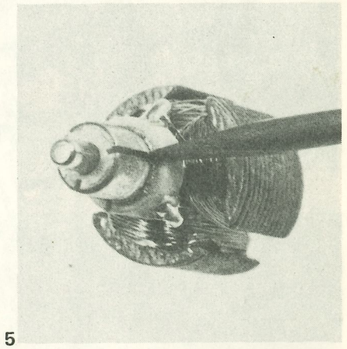

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If the track is too high, the car will stop dead. A situation that will soon become very frustrating. So make sure you've set up the track properly.

Track cleanliness and freedom from rust is just as important as rail height. Clean the rails with 500-600 grit or finer sandpaper or a track cleaning eraser. Then go over the whole track layout with Aurora's "Dust Rust Must Go" and a lint free rag. A vacuum cleaner really helps too!

The Super Magna Traction cars are fitted with special microcell sponge racing tires. Check to see that they are round and true, and run smoothly.

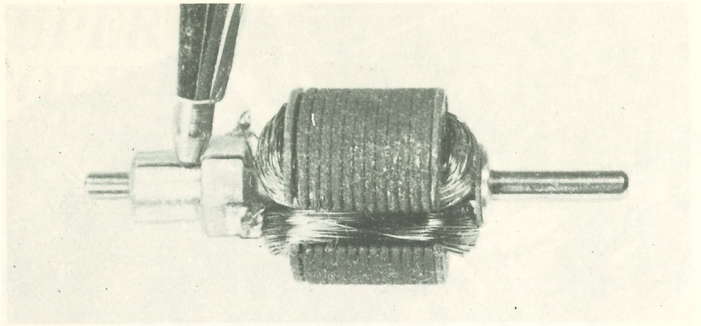
One trick that always works is to cement the tires to the rims and "Run sand" the tires in. To do this, simply remove the rear tires from the rims. Make sure the inside of the tires are clean and the rims are clean.

Then, put a thin coat of Contact Cement on both the inside of the tire and the outside of the wheel rim, push together and allow to dry for 30 minutes. The cement bonds the tires to the rims, so once you "true them up" they will stay. This is E-Z to do, and well worth the time and effort.

Cement a sheet of fine sandpaper to a piece of thin wood or cardboard (such as a tablet back). Place your car on the track (or hook it directly to the power supply) turn up the controller to full bore and slip the sandpaper under the rear wheels while they are spinning. Gently lower the car to the paper and watch the tire compound sand off. Round the inside and outside edges of the tire a little (to prevent flipping the car under racing conditions), but don't sand too far or you'll reduce the tire diameter to the point where the chassis will drag on the track rails.

IMPORTANT: Run sand the rear tires first because you'll have dust all over the chassis and in fine tuning, and for racing, cleanliness is the watchword.

The front wheels and tires must be checked to see that they are concentric. Since the front axles are mounted to the chassis, it's simple to measure them and see that they are square. Since Magna Traction cars pull the chassis down and really use the front wheels, it's



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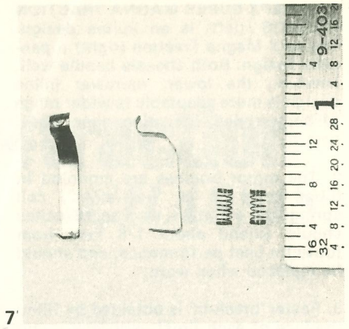

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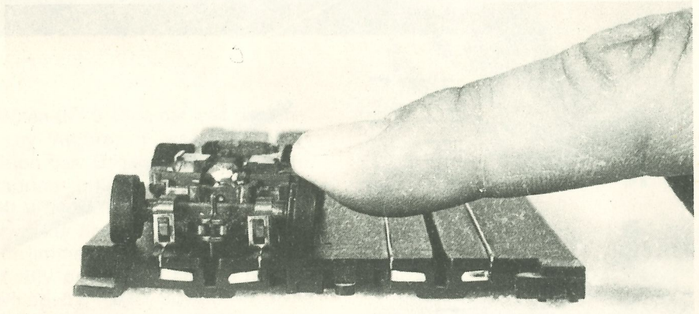

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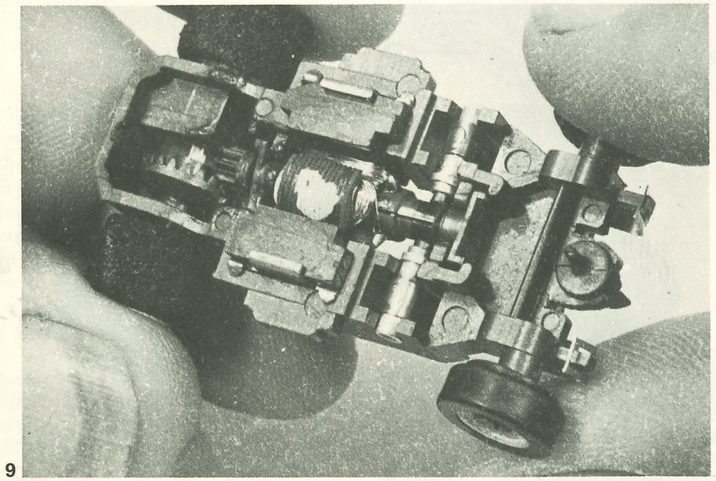

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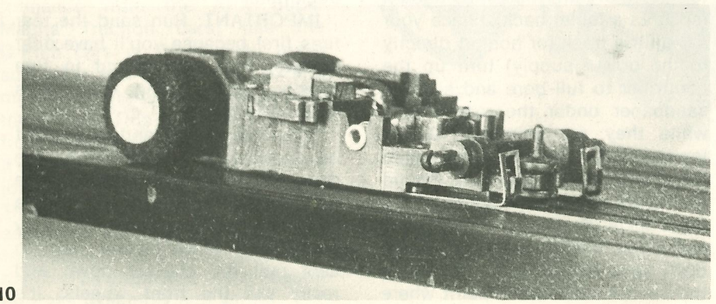

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6. Burnish edges of commutator segments using a medium ball-point pen. Apply pressure while moving pen tip back and forth. This takes off the sharp edges so brushes run smoother.

7. Pickup shoes feature "Wrap around" design to increase electrical contact, are to motor brushes. Keep contact area clean. Tension springs under shoes should have a "free" uncompressed length of 7/32" and be equal so shoes sit squarely on track rails.

8. For best racing performance, chassis must be 'square'. Check by setting it on track surface, then rotating front tires carefully with a finger while feeling resistance. All tires should rest on track with equal weight.

9. To correct squareness, 'tweak' chassis by gripping rear of chassis with your fingers and bend lowest front wheel up to lower chassis so both wheels touch track evenly. Then re-check and repeat if necessary. Do this before every race.

10. The pickup shoes must be parallel to track rails for maximum contact. Adjust them with small tweezers or fine pliers. (Remove wheels to check.)

important that they be round, lubricated and checked often for top performance.

The optimum chassis to track clearance is .040 inch, measured with the car sitting on all four tires on a flat piece of wood. This gives approximately .025" clearance between the chassis and the guard rails when the track rails are at the proper racing height of .015 inches above the track surface.

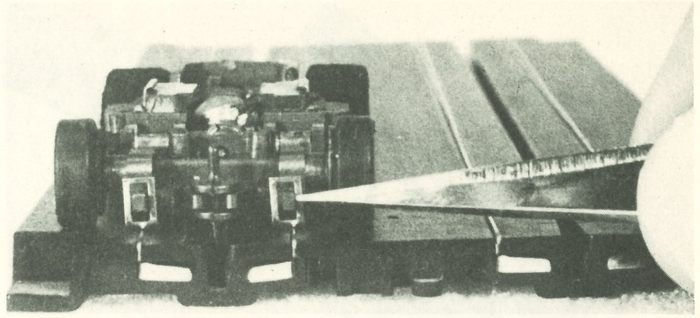
Clean tires is a must for top performance. Clean them often by rolling them over the adhesive side of masking tape until they are free from dust and dirt. Stay away from "Tire Goops" as this makes a mess of the cars and tracks, although it is widely used by some clubs.

Disassembly of the Super Magna Traction chassis is straightforward. The photos and drawings

11. These shoes should also be square when viewed from the front. Adjust with tweezers 'til they form a perfect 'T'. You want to pick up all the power you can get!

12. Aurora AFX Plus X2C oiler with synthetic oil and micro-capillary oil tube should be used for all oiling. BE CAREFUL! Over-oiling is DANGEROUS and can ruin your car. Follow the chart, oil every two hours of operation, and NEVER oil the motor commutator! On magnet cars, the front wheels require oiling more often.

13. "Run-sand" your rear tires. Mount them to the rims with contact cement. Run car motor on track, lower rear tires on sandpaper to "shape". Be careful, don't sand too much off or car will stick on rails.



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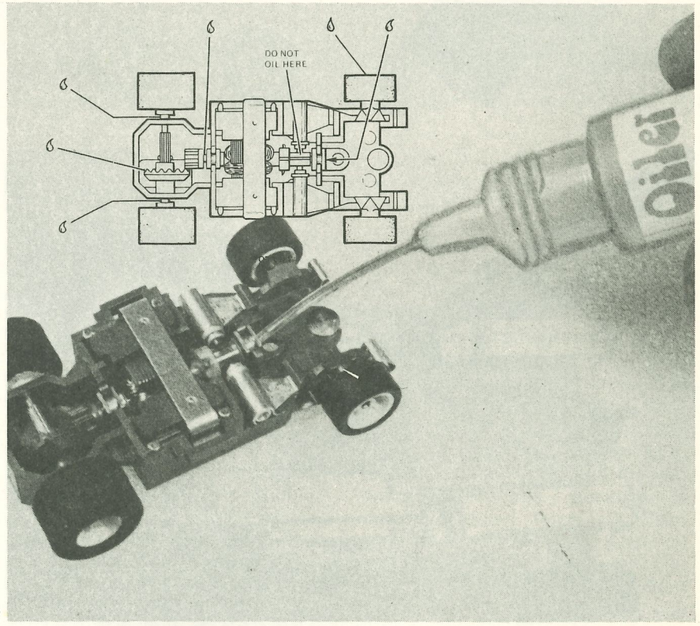

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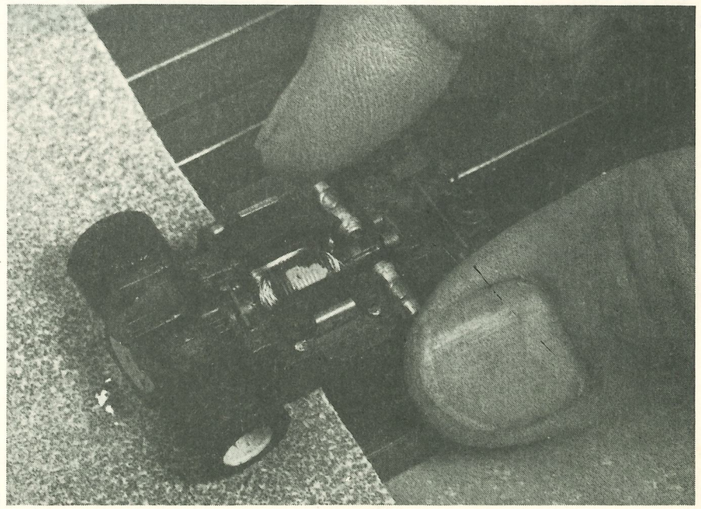

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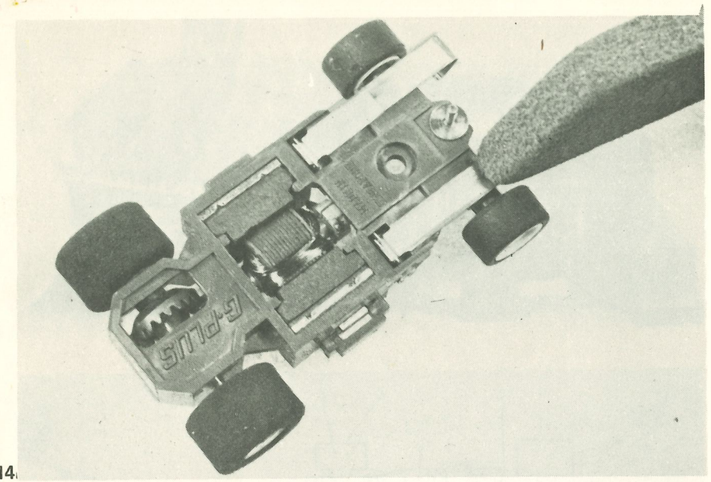
here show you the relationship of the parts. Do not remove any parts unless absolutely necessary, as the more you put them on and take them off, the looser the fit will get.

Check over all the parts carefully and see if there are any burrs or flash left from the manufacturing processes like moulding or stamping. These could cause misalignment. Also, make sure the chassis and parts are surgically clean. Dust and dirt will wear the parts out.

Small pieces of metal, picked up by the magnets can get into the commutator and armature and cause a short or even stop the car or even break a fine wire on the armature. This is another reason to keep your track clean, a stiff paint brush about 3" wide will help get these parts out. Even a powerful magnet run over the tracks before a race will help assure you the track is ready for racing. Or, even a vacuum cleaner. Many a race was lost because a staple or similar item was lodged in the armature.

The job of the pickup shoe is to get power to the motor. The Super Magna Traction car features a "wrap around" pickup shoe design. The bigger "hook" on the end of the shoe gives more surface contact to the motor brush, thus better contact—WHEN CLEAN! It's important to keep this section clean, so be sure your brush tubes and pickup shoes are clean at this point of contact.

Increasing commutator brush tension will improve contact with current flow to the armature. With the spring in the brush barrel, insert the brush. About 1/8 inch of the brush should stick out. When the

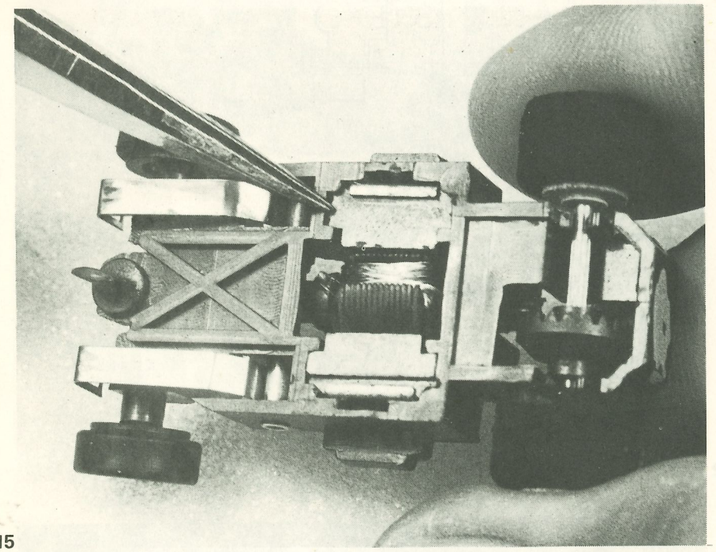


14

14. Clean the pickup shoes frequently, using a carborundum track eraser or fine, 500- or 600-grit sandpaper. For maximum power, replace pickups when worn.

15. By adjusting the tabs on the "Flux-Collectors" you can raise or lower the magnets to increase the magnetic force. Try lowering one magnet at a time. Some racers believe that this is better than lowering both, as it alters the "magnetic force" acting on the armature and increases RPM's.

16. Here's the AFX SUPER MAGNA TRACTION INLINE MOTOR PACKAGE. The parts are simple and functional and one of the strongest hi-revving electric motors in the world. The armature is dimensionally the same as the AFX G-Plus armature and can be interchanged. In fact, a quick and easy hop up for this motor, is to replace the armature with the G-Plus.



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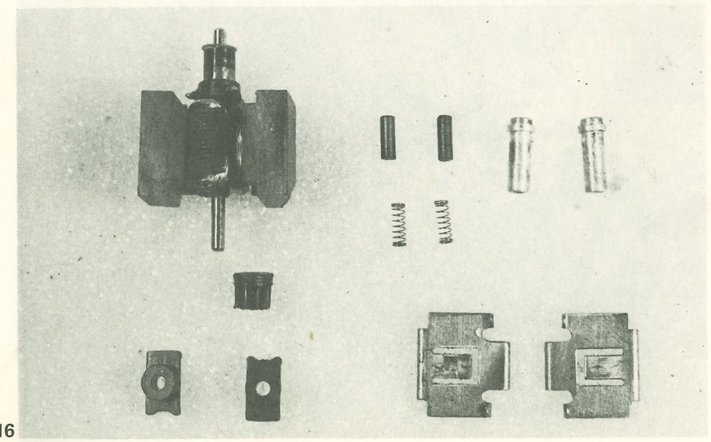

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brushes wear, either stretch the spring to maintain this measurement or replace the brushes.

Brushes may be 'radiused' to fit the commutator by filing their faces with a half-round jewelers' file. This will reduce break-in time. You'll find the car gets faster as the motor and brushes 'break in', but this reaches an optimum. Remember, nothing lasts forever! Real racing engines last only three hours before a complete rebuilding is necessary!

The commutator (the copper-colored barrel on the front of the armature) has three segments. These segments pick up the current from the brushes and carry it to the armature windings, producing an electromagnetic field that makes the motor run. The better condition it's in, the more easily current will flow and the more power and speed your motor will have.

Polish the commutator with 600-grit (very fine) sandpaper or a carborundum track-cleaning eraser. Do not use a pencil eraser here, because it leaves a residue that must be cleaned off. Between the commutator segments are thin separators (plastic insulation). As the commutator and brushes wear, deposits settle in these slots and, if enough accumulate, they can cause arcing, slow the motor down, or—if they fill up completely—short out the armature and cause it to burn up. Clean the slots with an Xacto knife or a toothpick. Be careful with theXacto knife, however! DO NOT DAMAGE the commutator segments or armature windings.

17. The AFX Super Magna Traction chassis and wheel group. Many of the regular AFX and G-Plus bodies will fit, so you can easily expand or update your favorite cars for racing. Because of the low, slim design, formula cars and Grand Prix car racing is now possible.

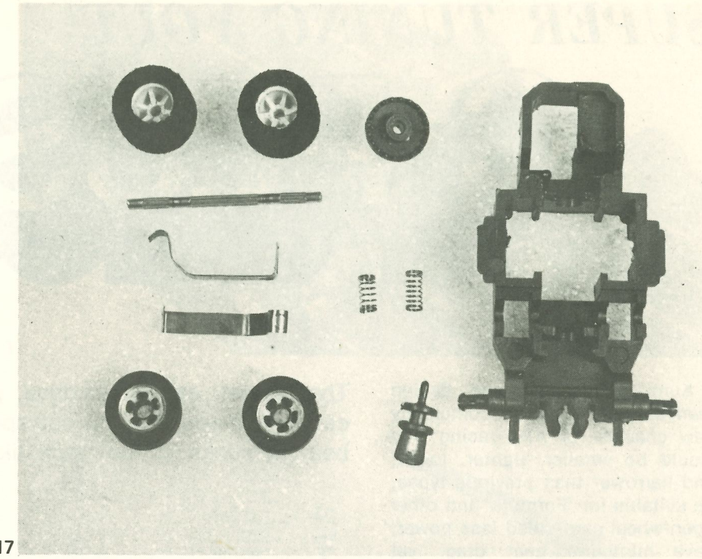
18. This exploded view shows all the parts of the AFX Super Magna Traction chassis and will be useful in maintaining your cars. All parts are available from Aurora Service Stations or hobby dealers.

For better cornering, Guide Pin #8601 may be replaced with G-Plus Guide Pin #8915 (old No. 8897)

Burnish the edges of the commutator segments with a medium-tip ballpoint pen. Merely run the tip of the pen back and forth along the segment separation line using moderate pressure. This burnishing helps to reduce brush wear and arcing.

Check to see that the free length of each pickup spring is 7/32 inch. If one is longer than the other, stretch the short one or replace. If the shoes are dirty or oxidized, clean then with 400- or 600-grit (fine) sandpaper. Some modelers use track erasers or pencil erasers, but if you try this, be sure to wipe off the residue.

When you place the car on the track, make sure the pickup shoes are flat and parallel to the track when viewed from the front or sides. Use tweezers to align the shoes and square them up. You want as much contact as possible for best performance. You may have to repeat this operation later, after you 'square up' the chassis.



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Make sure the chassis is 'square', a term used by the racing fraternity to indicate that all wheels are touching the track equally. "Tweaking" or "Weight Jacking" a chassis (as the NASCAR guys call it) means putting equal weight or more weight (depending on what you want) on the tires for better handling.

The car runs best when the chassis is 'square'. To check this, place the car on a straight section of track and rotate each front wheel to feel the friction. If they're equal, the chassis is 'square'. You can also observe this by looking closely. If the chassis is not square, adjust it by holding the rear of the chassis between the thumb and index finger of your left hand and twist the lowest front wheel up so you "lower" the chassis so both wheels touch evenly. Check again, then repeat the straightening operation if necessary.

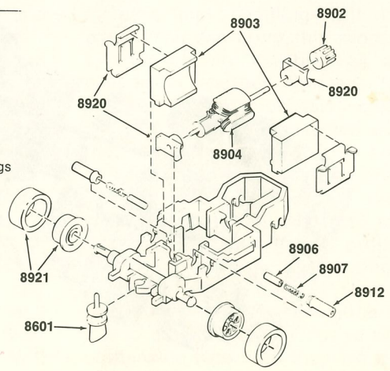
Lubrication is vital—but it's also dangerous if overdone. A tiny drop of oil goes a long way. Put only ONE drop of oil each on front axle, rear axle, pinion gear, and the two armature bearings. Because of magnetic down force—oil front wheels frequently! Aurora's X2C oil is best. DO NOT ALLOW ANY OIL TO GET ON THE MOTOR COMMUTATOR! It'll only slow you down.

You've got the tips: Now go and win races!

REPLACEMENT PARTS

PART NO.	DESCRIPTION
8601	Guide Pin
8612	Rear Axle
8902	Pinion Gear • 19 Tooth Crown Gear
8903	Magnet
8904	Armature
8906	Commutator Brush
8907	Commutator Brush Spring
8912	Brush Barrel
8913	Rear Wheel and Tire
* 8920	Flux Collectors and Armature Bearings
* 8921	Front Wheels and Tires
* 8922	Pick-Up Shoe Spring
* 8923	Pick-Up Shoes

**These noted parts are no longer packaged separately, although they may be available at some hobby dealers. However, all four now come in one parts package, Part No. 8927.*



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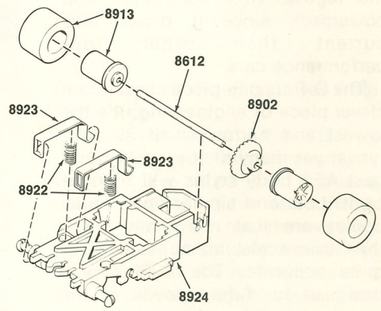


BOTTOM VIEW

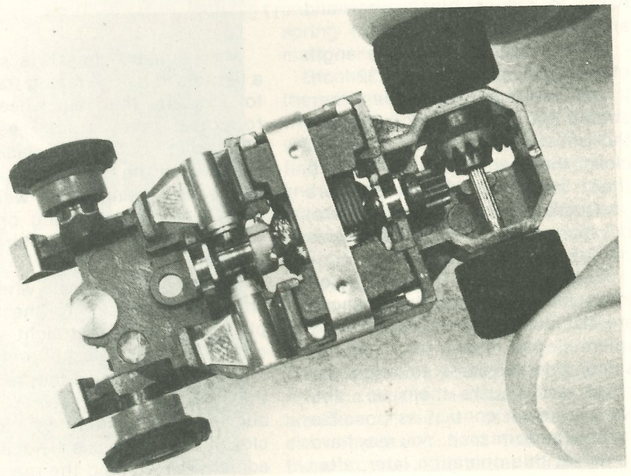
SUPER TUNING YOUR G-PLUS® CAR

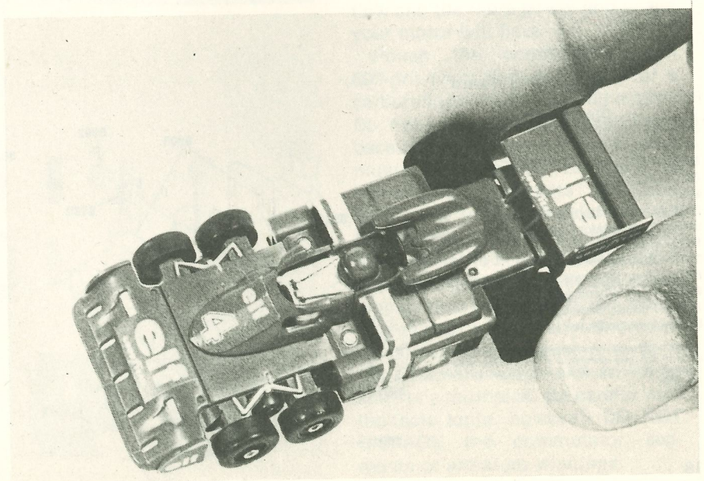
The fastest, easiest-to-drive, production model AFX racing car ever made. For all-out speed and handling, it can't be beat. It sticks to the track like glue . . .

Aurora's research and design team set out to create a completely new chassis for AFX racing that would be smaller, lighter, lower, and narrower than previous types, be suitable for 'Formula' and other open-wheel cars, need less power, have minimum gear drag, yet exhibit maximum road-holding capabilities for superfast racing. The result is the exciting "G-Plus" car. This completely new design features an in-line design using the motor's magnetic field and flux collectors to increase traction through magnetic force. The special monocoque-type motor uses part of the chassis for support and features brass bearings, a 'bulletproof' commutator, brushes with heat-sinks that require less power. Less power spells less heat for cooler running and maximum use of the available current.

The two-gear pinion-and-crown gear train reduces friction and the longer, wider pickup shoes stay on the rails even during sideways cornering. Best of all, the G-Plus car runs on regular AFX track, using the regular AFX controllers and powerpack since it draws less current than other top-performance cars.

The G-Plus one-piece chassis is a clever piece of engineering. It's the lowest and narrowest of all AFX types, yet many of the current and past AFX body styles will fit right on it! Lola and similar open-wheel bodies are just marginally wider than true scale, so appearance is quite accurate. The G-Plus was designed for future needs of the new breeds of racing machinery. It's the ground-huggingest Aurora car ever, and the lightest, weighing a mere 16.2 grams (without magnetic force acting). It's simple to work on, too—all 'clip and snap'.





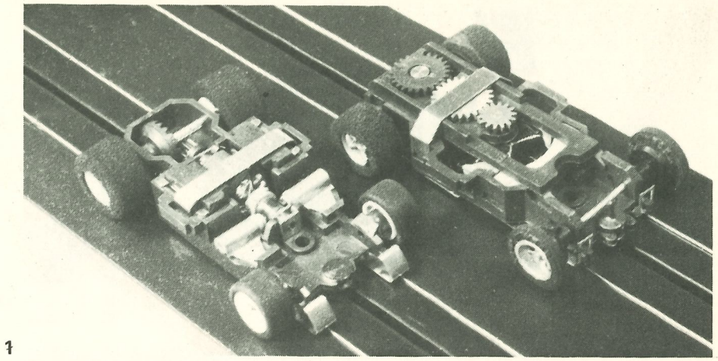
1. The AFX G-Plus chassis is lower, narrower, and lighter than that of any other AFX car. Its unique 'monocoque' inline motor is held together by part of the chassis, requires only two gears in driveline.

2. The motor brushes are mounted in tubes that act as 'heat-sinks', coil springs to maintain tension. Brushes should extend about 1/8 inch from tubes for best performance, and should be replaced when worn.

3. Faster 'break-in' is obtained by filing the face of each brush with half-round jewelers' file so it sits on commutator. Put both brushes in the brush tube to hold them as you file.

4. Clean and polish commutator frequently with 500- or 600-grit (fine) sandpaper, or carborundum track eraser. Keep commutator free from oil, dirt, and carbon from motor brushes.

5. Clean out grooves between commutator segments with Xacto knife or sharp screwdriver. This removes carbon deposit left by motor-brush wear and any residue left from polishing. DON'T damage armature windings or segments!



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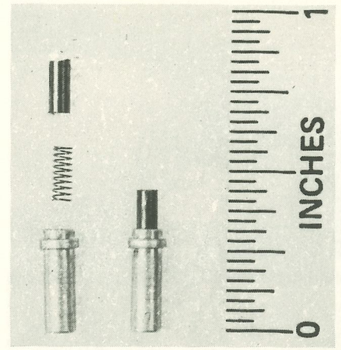

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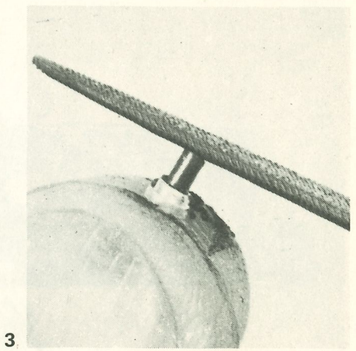

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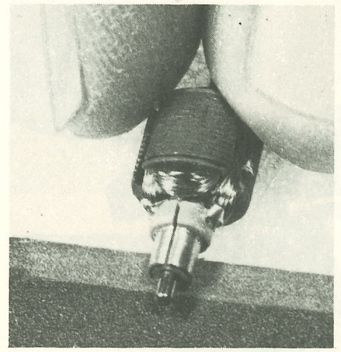

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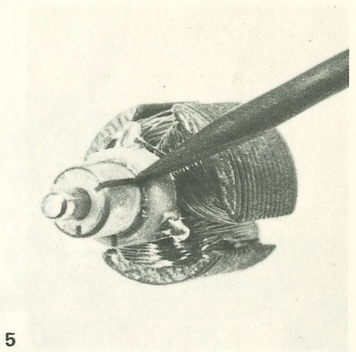

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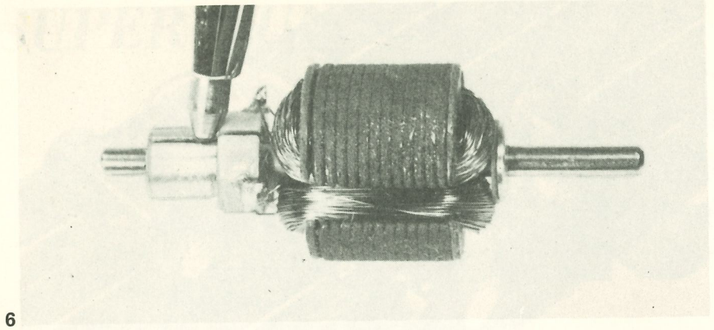
Because of the chassis' low design and minimum clearance, your track setup is very important. All track joints must be smooth and properly aligned. Even the steel contact rails must be level, and not protrude too much from the track surface. Small rail-height differences may exist due to manufacturing tolerances: These may be corrected by tapping down high rails with a block of wood and a hammer. If the rails are too low, push them up from underneath, using a screwdriver. The rails should extend 0.015 inch above track surface; if they're too high, the G-Plus car is a 'rail-ripper' and will stop dead if it contacts a rail.

Track cleanliness and freedom from rust are just as important as rail height. Clean the rails with 400-grit or finer sandpaper or a track cleaning eraser, then go over the whole track layout with Aurora's 'Dust Rust Must Go' and a lint-free rag.

While the G-Plus car is fitted with special trued and sanded microcell racing tires, check to see that they're cemented in place and are running true. As the tires wear down, magnetic 'downforce' will increase and handling will improve. You can hurry this process by 'run-sanding' the tires as explained in another chapter. The optimum track-to-chassis clearance is 0.040 inch, measured with the car sitting on all four tires on a flat piece of wood. This gives approximately 0.025 inch clearance between chassis and track rails, which normally project 0.015 inch above the track surface.

Clean tires are a 'must' for top performance. Clean them often by rolling them over the adhesive side of masking tape until they are free from dust and dirt. Stay away from 'tire goops'!

Disassembly of the G-Plus chassis is quite straightforward, as you can see from the exploded drawings showing the relationship of the parts. Do not remove any parts unless absolutely necessary: Such items as the rear wheels and axle, crown and pinion gears, are press-on/pull-off assemblies and may be damaged if worked on constantly. Study the drawings before you begin and note that the special sportscar chassis (without tabs) No. 8911 is not shown. All



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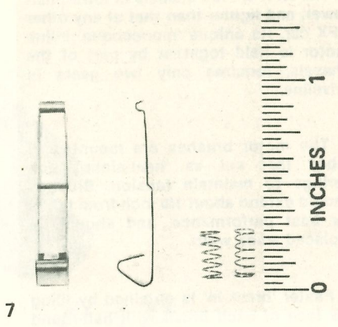
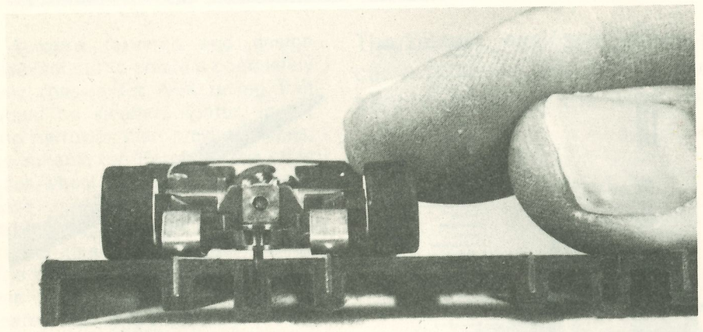


7

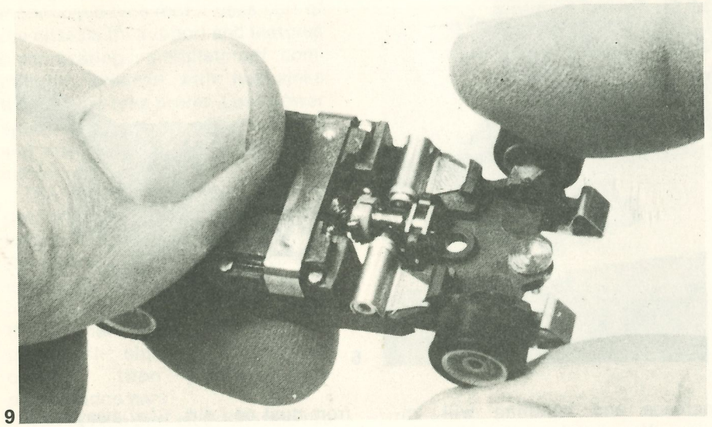
6. Burnish edges of commutator segments using a medium ball-point pen. Apply pressure while moving pen tip back and forth. This takes off the sharp edges so brushes run smoother.



8

7. Pickup shoes have longer and wider contact for 'sliding' and sharp turns. Tension springs under shoes should have a 'free' (uncompressed) length of 7/32 inch and be equal so shoes set squarely on track rails.

8. For best racing performance, chassis must be 'square'. Check by setting it on track surface, then rotating front tires carefully with a finger while feeling resistance. All tires should rest on track with equal weight.



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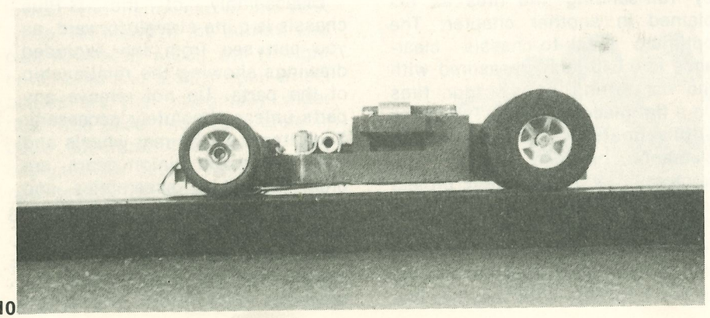
9. To correct squareness, 'tweak' chassis by gripping rear of chassis with your fingers and bend lowest front wheel up to lower chassis so both wheels touch track evenly. Then recheck and repeat if necessary. Do this before every race.



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10. The pickup shoes must be parallel to track rails for maximum contact. Adjust them with small tweezers or fine pliers. (Remove wheels to check.)

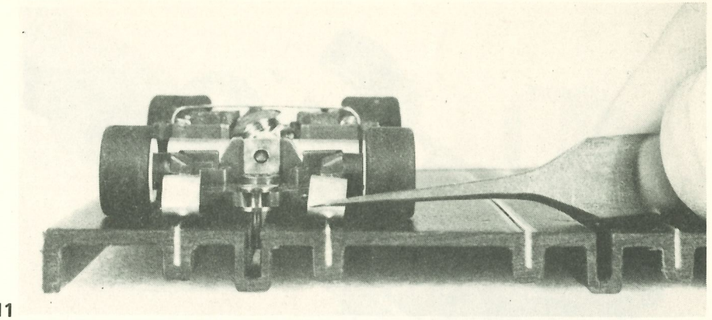
other parts are the same.

The G-Plus motor is tiny but powerful. Because the chassis holds many of the motor parts together, it must be treated as a unit and cleaned thoroughly. Any plastic flash from molding, dirt, or hair inside will cause misalignment, so keep the chassis surgically clean for best performance.

Increasing commutator brush tension will improve contact and current flow to the armature. With the spring in the brush barrel, insert the brush. About 1/8 inch of the brush should stick out. When the brushes wear, either stretch the spring to maintain this measurement or replace the brushes.

11. These shoes should also be square when viewed from the front. Adjust with tweezers 'til they form a perfect 'T'. You want to pick up all the power you can get!

12. Aurora AFX Plus X2C oiler with synthetic oil and micro-capillary oil tube should be used for all oiling. BE CAREFUL! Over-oiling is DANGEROUS and can ruin your car. Follow the chart, oil every two hours of operation, and NEVER oil the motor commutator! On magnet cars, the front wheels require oiling more often.



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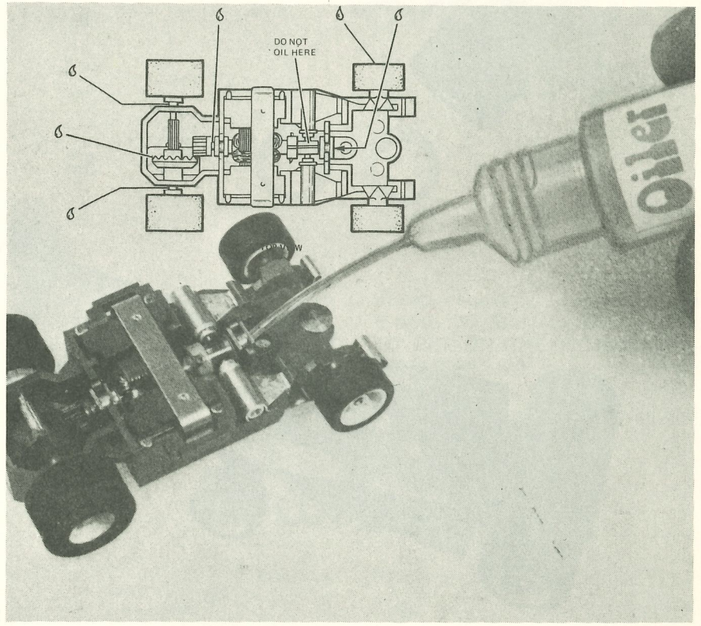
13. While all AFX G-Plus cars are fitted with run-sanded tires, you can 'touch them up' as shown in another chapter. As the tires wear down, you'll get increased magnetic 'downforce'. Be careful, tho', or your chassis will strike the steel rails. Proper chassis height is 0.040 inch when measured on a flat board. Clean your tires often by running them over the adhesive side of masking tape.

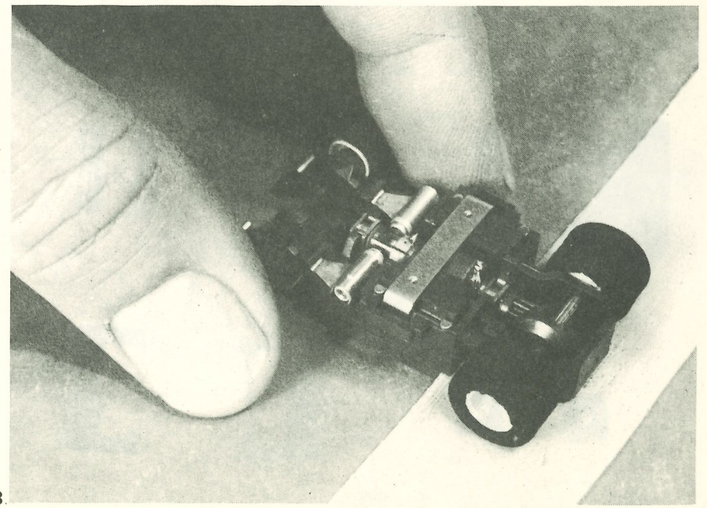


12

Brushes may be 'radiused' to fit the commutator by filing their faces with a half-round jewelers' file. This will reduce break-in time. You'll find the G-Plus car gets faster as the motor and brushes 'break-in', but this reaches an optimum. Remember, nothing lasts forever! Real racing engines last only three hours before a complete rebuilding is necessary!

The commutator (the copper-colored barrel on the front of the armature) has three segments. These segments pick up the current from the brushes and carry it to the armature windings, producing an electromagnetic field that makes the motor run. The better condition it's in, the more easily current will flow and the more power and speed your motor will have.

Polish the commutator with 600-grit (very fine) sandpaper or a carborundum track-cleaning eraser. Do not use a pencil eraser here, because it leaves a residue that must be cleaned off. Between the commutator segments are thin separators (plastic insulation). As the commutator and brushes wear, deposits settle in these slots and, if enough accumulate, they can cause arcing, slow the motor down, or—if they fill up completely—short out the armature and cause it to burn up. Clean the slots with an Xacto knife or a toothpick. Be careful with



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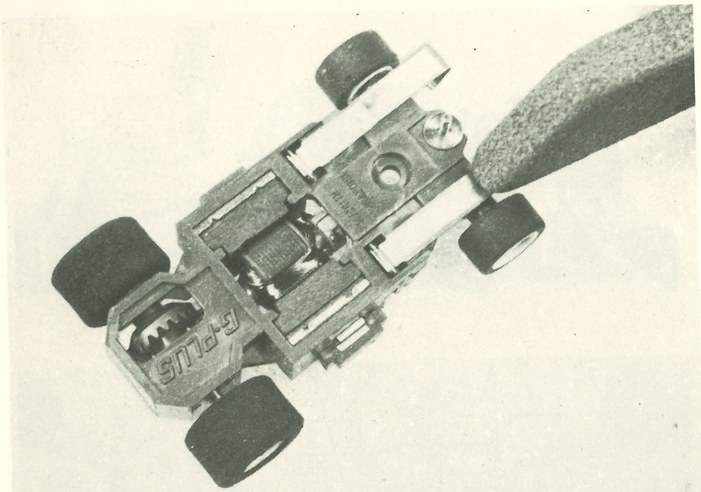

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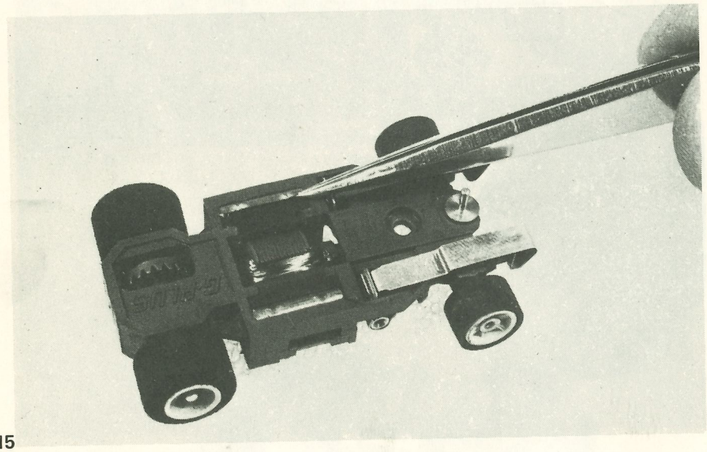

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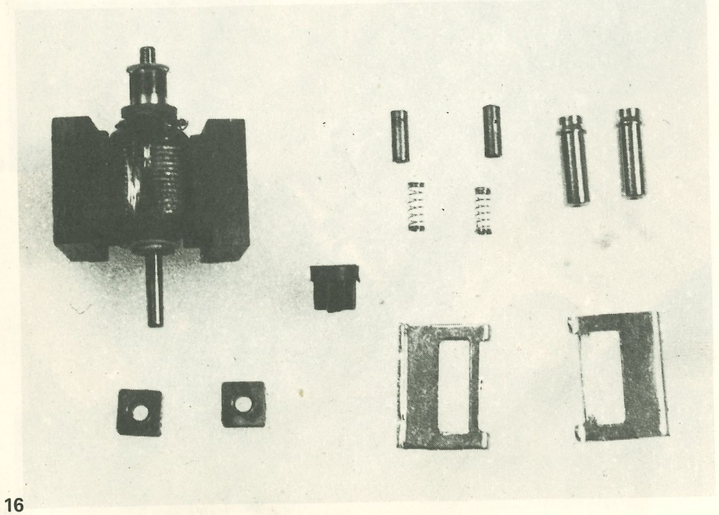


16

14. Clean the pickup shoes frequently, using a carborundum track eraser or fine, 500- or 600-grit sandpaper. For maximum power, replace pickups when worn.

15. By adjusting the "Flux-Collector" tabs you can raise or lower the magnets in the chassis to increase the magnetic force. Try lowering the magnets one at a time. Some racers believe that this is better than lowering both, as it alters the magnetic force acting upon the armature and increases RPM's.

16. Here's the G-Plus in-line motor package. It's a 'full house' racing motor of great precision. The powerful magnets also create a 'downforce' for better roadholding, one of the car's secrets. Using part of the chassis to hold motor components together saved weight and improved performance.

the Xacto knife, however! DO NOT DAMAGE the commutator segments or armature windings.

Burnish the edges of the commutator segments with a medium-tip ballpoint pen. Merely run the tip of the pen back and forth along the segment separation line using moderate pressure. This burnishing helps to reduce brush wear and arcing.

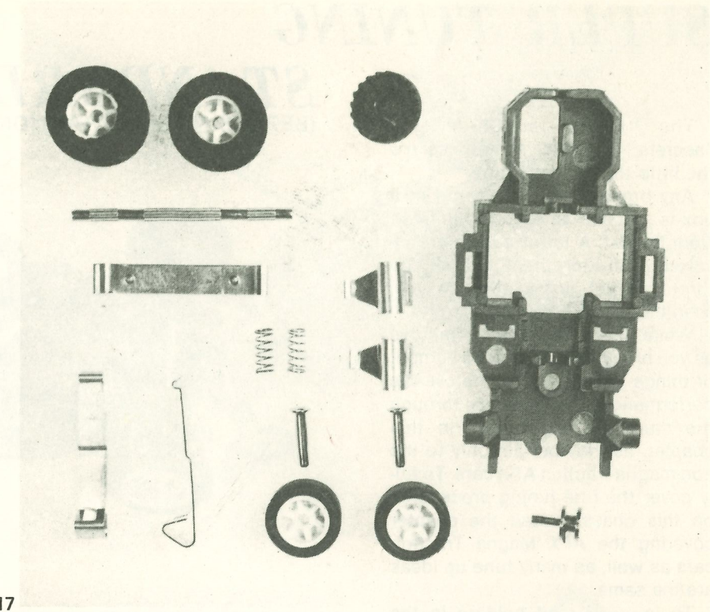
The job of the pickup shoes is getting power to the motor. These extend out in front more and are wider than those of the standard AFX chassis, to give you contact in twisty turns or when you have the tail 'hung out' in fast cornering. Check to see that the free length of each pickup spring is 7/32 inch. If one is longer than the other, stretch the short one or replace. If the shoes are dirty or oxidized, clean them with 400- or 600-grit (fine) sandpaper. Some modelers use track erasers or pencil erasers, but if you try this, be sure to wipe off the residue.

When you place the car on the track, make sure the pickup shoes are flat and parallel to the track when viewed from the front or sides. Use tweezers to align the shoes and square them up. You want as much contact as possible for best performance. You may have to repeat this operation later, after you 'square up' the chassis.

Make sure the chassis is 'square', a term used by the racing fraternity to indicate that all wheels are touching the track equally. "Tweaking" or "Weight Jacking" a chassis (as the NASCAR guys call it) means putting equal weight or

17. G-Plus chassis and wheel group. Many of the regular AFX bodies WILL fit this chassis, so you can easily expand your stable of "G" racing cars. With its low, narrow, in-line configuration, this chassis is ideally suited to open-wheel and Formula cars. Only two gears make up the drive-train, so gear friction is reduced to a minimum.

18. This exploded view shows all the parts of the G-Plus chassis and will be useful in maintaining your cars. All parts are available from Aurora Service Stations or hobby dealers.



17

more weight (depending on what you want) on the tires for better handling.

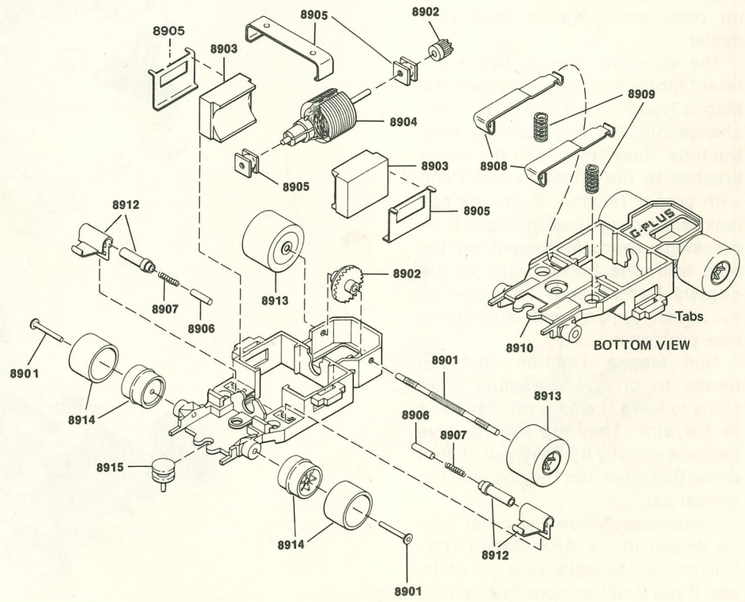
The G-Plus car runs best when the chassis is 'square'. To check this, place the car on a straight section of track and rotate each front wheel to feel the friction. If they're equal, the chassis is 'square'. You can also observe this by looking closely. If the chassis is not square, adjust it by holding the rear of the chassis between the thumb and index finger of your left hand and twist the lowest front wheel up so you "lower" the chassis so both wheels touch evenly. Check again, then repeat the straightening operation is necessary.

Lubrication is vital—but it's also dangerous if overdone. A tiny drop of oil goes a long way. Put only ONE drop of oil on each front axle, rear axle, pinion gear, and the two armature bearings. Because of magnetic down force—oil front wheels frequently! Aurora's X2C oil is best. DO NOT ALLOW ANY OIL TO GET ON THE MOTOR COMMUTATOR! It'll only slow you down.

You've got the tips: Now go and win races!

NEW Part Nos.	OLD Part Nos.	DESCRIPTION
8901 or	8896	Front Axle (pr.)
	8877	Rear Axle
8902 or	8878	20T. Crown Gear
	8879	8T. Pinion Gear
8903 or	8880	Magnets (pr.)
8904 or	8881	Armature w/Spacer
8905 or	8882	Armature Bearings (pr.)
	8883	Flux Collectors (pr.)
	8884	Magnet Retaining Clip
8906 or	8885	Commutator Brushes (pr.)
8907 or	8886	Commutator Brush Springs (pr.)
8908 or	8887	Pick-Up Shoes (pr.)
8909 or	8888	Pick-Up Shoe Springs (pr.)
8910 or	8889	Chassis w/Tabs
8911 or	8890	Chassis w/o Tabs (not shown)
8912 or	8891	Brush Holder (pr.)
	8892	Brush Barrel (pr.)
8913 or	8893	Rear Wheel and Tire Assy. (pr.)
8914 or	8894	Front Wheel (pr.)
	8895	Front Tire (pr.)
8915 or	8897	Guide Pin

G-PLUS CAR



SUPER TUNING

STANDARD AFX CARS

(BEFORE MAGNA TRACTION)

The "tricks" are here, the "secrets" exposed, sometimes it's the little things that count.

Any brand new AFX car out of a box is just like an automobile fresh from Detroit. A lot of people are involved in making them and they go through a lot just getting to you, even though they are new.

While performance will improve as you break it in, there are a number of things you can do to improve the performance. We'll take you through the steps of fine tuning in this chapter, as they pertain only to the non-magna-traction AFX cars. To fully cover the fine tuning procedures on this chassis, read the chapter covering the AFX Magna Traction cars as well, as many tune up ideas are the same.

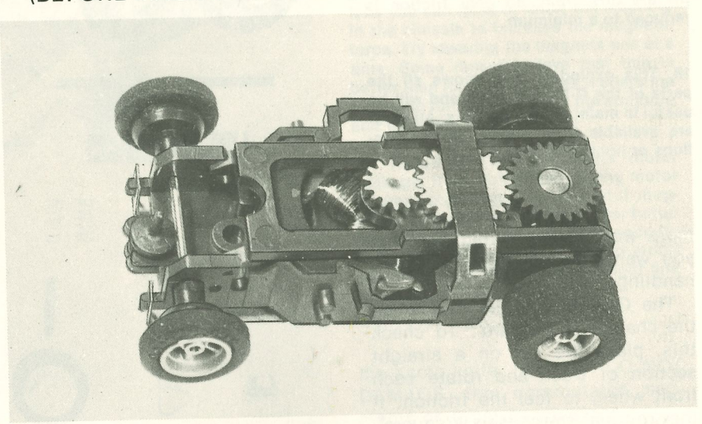
To improve road holding in the slot, the steel guide pin used on the G-Plus cars is a winner! The "reverse" taper and minimum size diameter helps reduce friction. This pin will slip right into the chassis and is available from your Aurora Service Center. Try it and you'll see the difference.

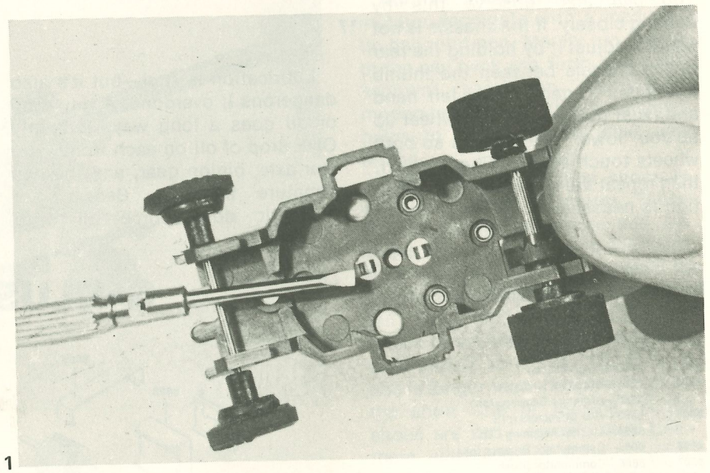
To improve acceleration and top speed, use the AFX Magna Traction armature. This is an exact replacement and is easily replaced. These too, and many other service and hop up parts are available from your dealer.

The standard chassis has a different motor brush system than the Magna Traction cars and is not interchangeable. It's important to keep the little "feet" that push the motor brushes to the armature clean and with proper tension. If the springs lack tension you can increase it by pressing a sharp instrument into the hole from the bottom side of the chassis. Don't overdo it however, as too much tension will only create new problems.

Non Magna Traction cars are harder to drive and require more skills to keep them on the track and in the slot. They are fun to drive because usually it's the most skillful driver that wins, not the one with the fastest car.

Remember, follow the other tune up details in the AFX Magna Traction chapter to make your car a winner. If you don't somebody else will!





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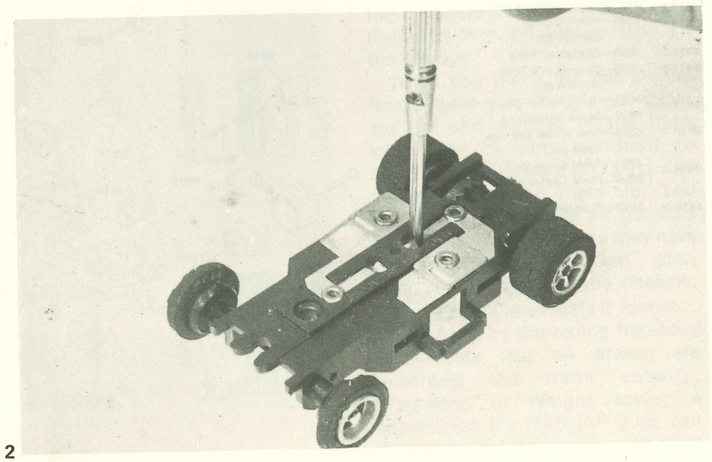

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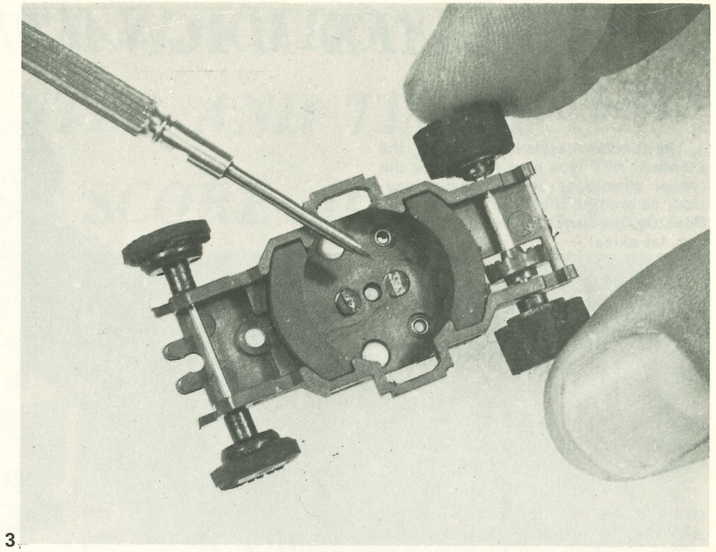
1. The standard chassis is different than the Magna Traction. Little "feet" press up against the motor brushes. Note: the chassis is "solid" where the magnets go, the Magna Traction chassis is slotted so the magnets are exposed out the bottom.

2. Brush tension may be increased by pressing the "feet" with a fine screwdriver blade from the chassis underside. Be careful, too much tension increases drag.

3. Check the motor brushes for dirt and wear. If they are worn, replace them. Make sure this area is clean for best electrical contact. A narrow strip of masking tape fitted to the outside of the magnets will shim them closer to the armature for more power.

4. Keep the armature clean. A simple HOP-UP is to install a Magna Traction Armature. It is the same dimension and drops right into place, providing more performance and speed.

5. This assembly drawing and parts list will be useful in maintaining your cars. Brushes, pickups, chassis are not all interchangeable with Aurora AFX cars so be sure you note the part number.



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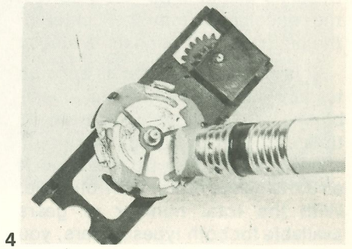
AURORA® AFX®



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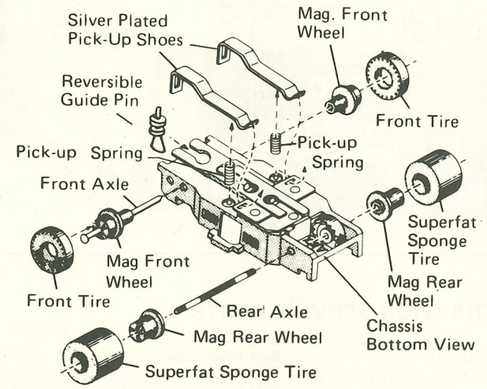
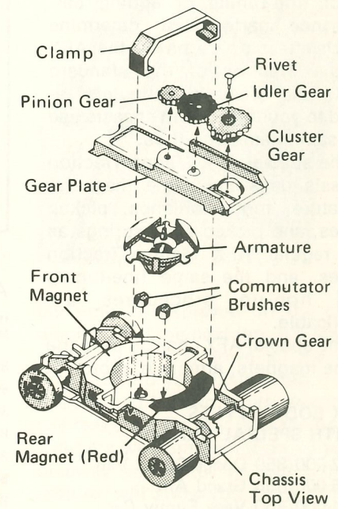
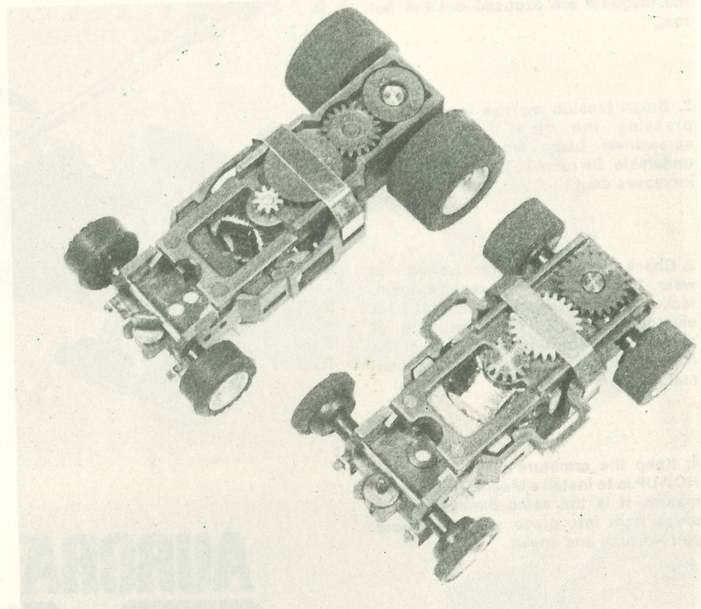




NEW No.	DESCRIPTION	FORMER PART No.
8700	Magnets (Pair)	8502
8701	Armature	8507
8702	Gear Plate Clamp	8517
8703	Guide Pin	8571 (8509)
8704	Pick Up Shoes (Pair)	8521
8705	Pick Up Shoe Springs (Pair)	8522
8706	Commutator Brushes (Pair)	8503
8710	Std. Chassis	8520
8711	Std. Chassis Gear, Plate & Cluster Gear	8516 (8530)
8712	Std. Chassis 14 Tooth Pinion Gear	8518
8713	Std. Chassis 24 Tooth Idler Gear	8515
8714	Std. Chassis 15 Tooth Crown Gear	8514
8715	Std. Chassis Front Axle	8523
8716	Std. Chassis Front Wheels (Pair)	8524
8717	Std. Chassis Front Tires (Pair)	8511
8718	Std. Chassis Rear Axle	8525
8719	Std. Rear Wheels (Pair)	8527
8720	Std. Chassis Rear Tires (Pair)	8510

5

SPECIAL AFX MAGNA TRACTION CHASSIS



1. The special chassis is on the left, the standard AFX type next to it. Note the longer wheelbase and guide-pin location, as well as the extra gear on top. See, too, the narrow rear end with those big, fat skins!

A variety of special vehicles are available for 'fun racing' by the enthusiast who wants something different. The customizing potential of these specials is unlimited. The chassis is unique to AFX, the biggest difference being in the rear end and gear group and the super-size sponge rear tires that are fitted.

The power flows through six gears instead of the five in a normal AFX chassis. Four of them are visible on the top deck, two underneath. Because of the extra gears on top, the wheelbase from the center of the pinion to the rear axle is longer.

This new special chassis appears to have many experimental possibilities. For example, extra-wide tires can now be fitted. The guide shoe is way out in front, as much as 3/16 inch ahead of the front axle. With the total number of gears available for both types of cars, you may find some of them to be interchangeable, thus permitting the altering of gear ratios.

For fine-tuning or adding performance parts, first determine which chassis you have—the AFX Magna Traction or the standard AFX—and study the chapters related to your type. Both chassis use the same gears and tires.

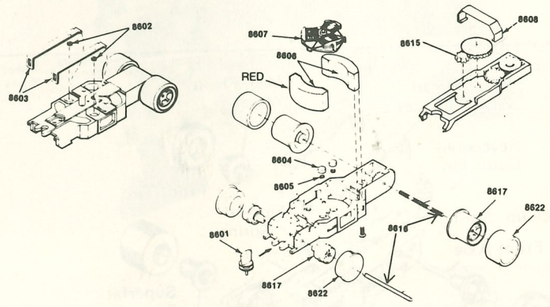
The special AFX Magna Traction chassis uses the same magnets, armature, motor brushes, pickup shoes, and pickup-shoe springs as the regular AFX Magna Traction series, and the same fine-tuning and hop-up procedures are applicable.

The special AFX chassis uses the same magnets, armature, motor.

AFX BODY STYLES WITH SPECIAL CHASSIS

1922-000/850 Dodge Street Van
1926-000/850 Grand Am
1934-000/850 Vega Funny Car
1937-000/850 Dodge Van Rescue Vehicle
1941-000/850 '56 Ford Pickup
1942-000/850 Custom Van
1943-000/850 Ford Street Van
1946-000/850 Police Van

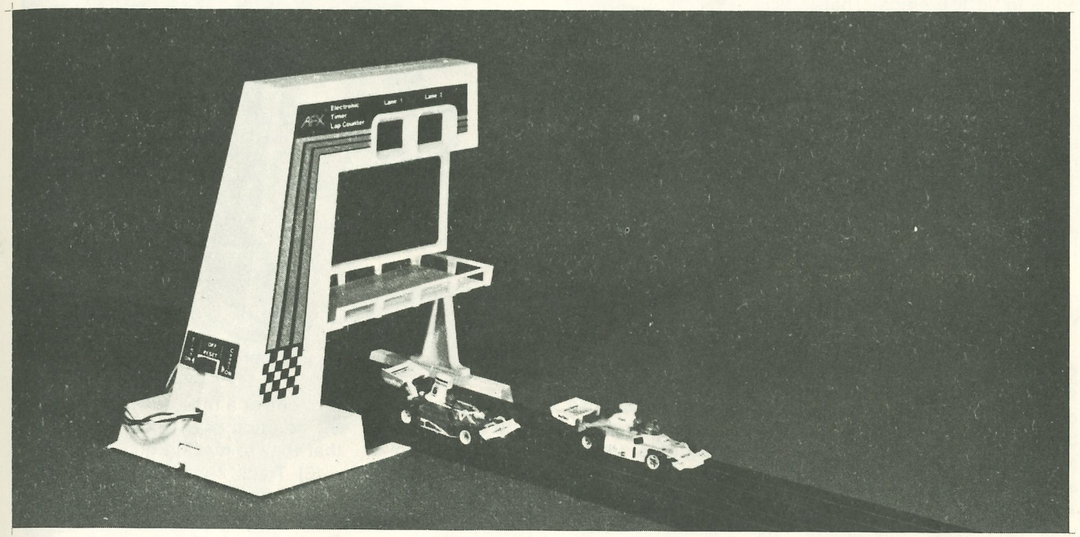
AFX SPECIALTY CAR FEATURING MAGNA TRACTION

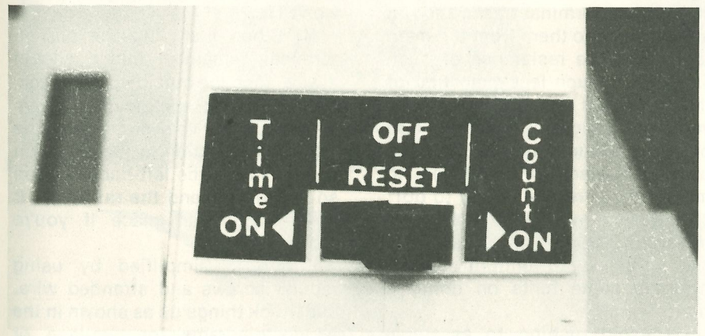


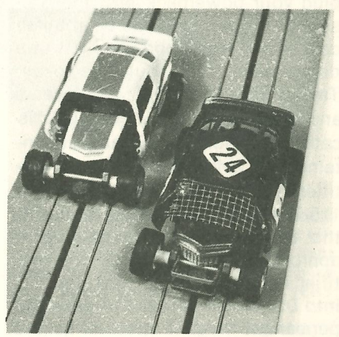
AFX MAGNA-TRACTION SERVICE PARTS

Item No.	Description
8601	Guide Pin (2 ea.)
8602	Pick-up shoe springs (2 pr.)
8603	Pick-up shoes (1 pr.)
8604	Commutator brushes (1 pr.)
8605	Commutator brush springs (2 pr.)
8606	Magna-Traction magnets (1 ea.)
8607	Magna-Traction armature (1 ea.)
8608	Gear Plate Clamp (1 ea.)
8609	Magna-Traction standard chassis (1 ea.)
8610	Magna-Traction standard gear plate (1 ea.)
8611	Magna-Traction standard gear set (1 set)
8612	Magna-Traction standard axle set (1 set)
8613	Magna-Traction standard wheel set (1 set)
8614	Magna-Traction standard tire set (1 set)
8615	Magna-Traction special gear set (1 set)
8616	Magna-Traction special axle set (1 set)
8617	Magna-Traction special wheel set (1 set)
8618	Magna-Traction specialty chassis tire set (1 set)
8620	Track repair clips (2 sets)

AURORA'S AFX ELECTRONIC 2 in 1 LAP COUNTER AND TIMER KEEPS SCORE ACCURATELY







AFX racers everywhere are welcoming the electronic age. Magna Traction cars, with super motors; Cars that look like the real thing in miniature; Track and accessories that make building replicas of real raceways easy. Always getting closer to real racing in miniature.

This electronic accessory is a welcome device as its electronic circuitry provides both LAP COUNTING and LAP TIMING with great accuracy in a LED (Light Emitting Diode) Digital Error Free Display.

It has a dual operation, operated by a simple switch. You can run qualifying heats by actually taking individual lap times to 1/10th of a second, then flip the switch to count laps for the races.

It will count laps from 0 to 99 laps and then start counting all over again, so that long races, hundreds of laps or more, can be counted accurately.

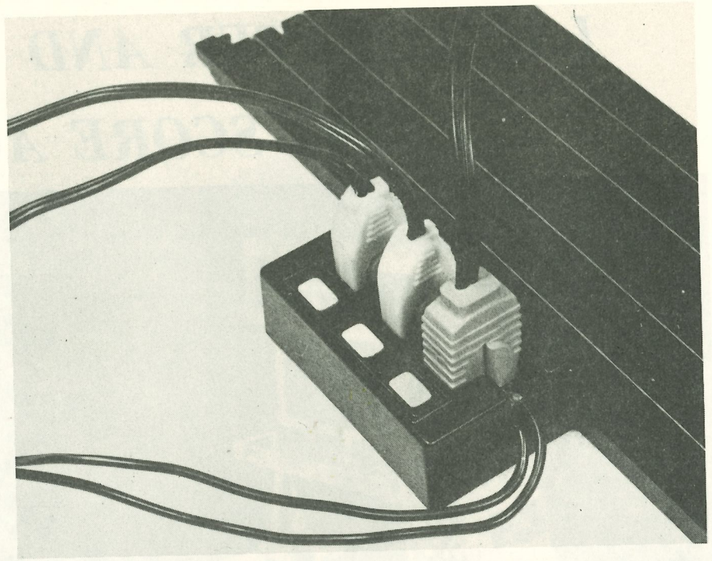
Lap timing is a breeze, as the car trips the circuit every lap and every lap time is displayed on the LED display until the next lap. It's just a matter of writing down all the lap times to find your fastest lap.

Designed for two lanes, you can use two units for four lane racing. It will be a welcome addition to your raceway and with the lap timing feature, will allow you to try different things on your cars and see whether or not they make a difference.

PLUG-IN POWER TO THE CARS

The new AURORA AFX plug in system is foolproof. All the wiring is color coded and wired into plugs. This makes hooking up your AFX System a snap! You will be racing in minutes after you get your set, but there is more to it than just hooking up the plugs. That is why you should carefully read this chapter, look at the photos, and study the assembly.

Since many AFX owners still have the former track equipment that requires wiring, the necessary information related to those products is also included. Thus, whatever equipment you have or wish to hook up, here is the information that will make you an expert.



No matter how many modifications you make to your AFX cars, they won't run worth a darn if the pickups don't get the same power everywhere on the track. Most commercial tracks and club tracks have adequate wiring, but the average home track's hookup falls far short of the ideal. In this chapter, we'll show you how to make sure your cars don't 'run out of gas' because of poor track power.

The power flow begins when you plug your powerpack into the wall socket. If your pack has been taken care of and not dropped or left in a damp place, it should be okay. Treat it right and it will last for years and years. The AFX power unit is called a 'powerpack' because it contains both a transformer and a rectifier. The transformer reduces the 115-volt AC (alternating current) that comes out of the wall plug to approximately 18-volt AC. The rectifier's function is to turn that AC into DC (direct current) to drive the permanent-magnet motors in the cars. Under no circumstances should you ever attempt to run your set with an AC transformer! Alternating current is 'instant death' to permag motors. If you have any doubts about your powerpack, take it to an Aurora Service Station for checking or do it yourself with a voltmeter.

From the powerpack on, good wiring is essential. Clean, tight connections from the controllers to the track terminals are a 'must'; loose or broken wires won't let the motors get the power they need. On long racetracks, the situation is especially critical due to the normal electrical resistance of the steel rails and the 'butted' track connections. In fact, if you measure the voltage halfway around the track from the terminals, you'll find a slight loss even if everything is tight. Some modelers prefer to install several terminal tracks and run jumper wires to them from the main terminals. The resistance of such jumpers is much less than that of the track and its connections so you'll get a more even distribution of power around the track. If you use this system, be careful not to mix up the wires—it's easy to do!

Now that you understand how important proper track assembly and wiring is to uniform power, here are some hints on doing it right:

(1) Avoid rushing to assemble your track the minute you take it out of the box! Read the directions supplied with the set and work carefully. This will save you time and (more importantly) trouble in the long run.

(2) Check each section of track before you assemble it to the layout, examining the rail ends carefully. These sometimes get bent and are more easily straightened before track assembly. Use the track tool, Part No. 1590. Just insert the prongs and give a little twist. Assemble three or four track sections at a time, always checking the position of the rail ends to see that they're making good contact.

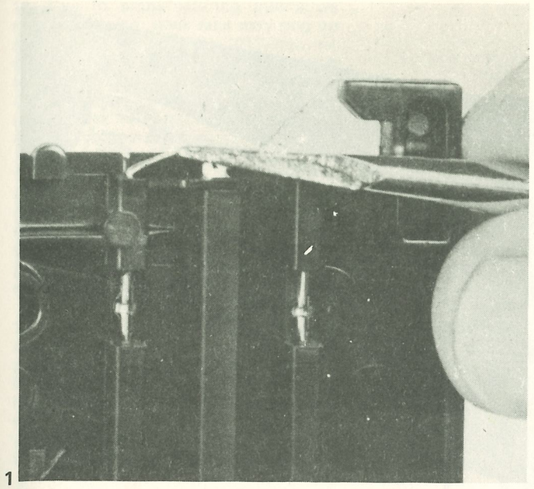
(3) Track clips aren't necessary but are helpful if you happen to break off a track locking tab. For Daytona and Hairpin curves, you must rotate the clips 90 degrees from their normal position or they won't fit.

(4) When installing the clip-on terminal, remember that it should always face the outside of the track. There's a small trick involved in installing this: You start with the right-hand section of track, then carefully fit in the left-hand section so you don't bend the rail ends. It snaps right into place if you're careful.

Wiring is simplified by using regular screws and stranded wire. Just hook things up as shown in the wiring diagrams for two-lane or four-lane layouts. Many modelers prefer to use one powerpack for each two lanes and, if you've modified your cars, this method is recommended. If you go into six-lane racing, you definitely need one pack for each two lanes.

Hookup of controllers other than the standard AFX units is also illustrated. If you're racing modified cars with 'hot' armatures you'll need a heavy-duty controller with a lower ohm rating, 30 ohms or less.

You can test your track, a section at a time, using Aurora Combina-



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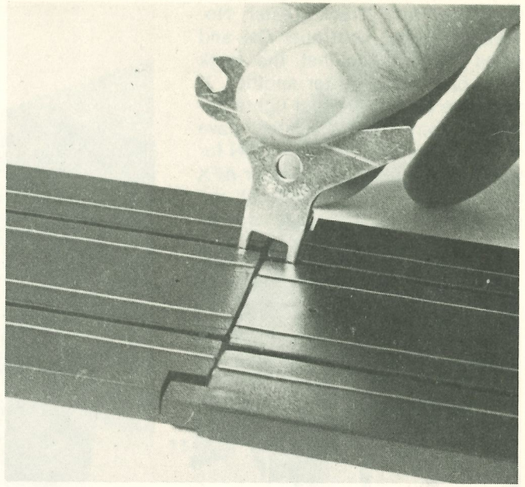

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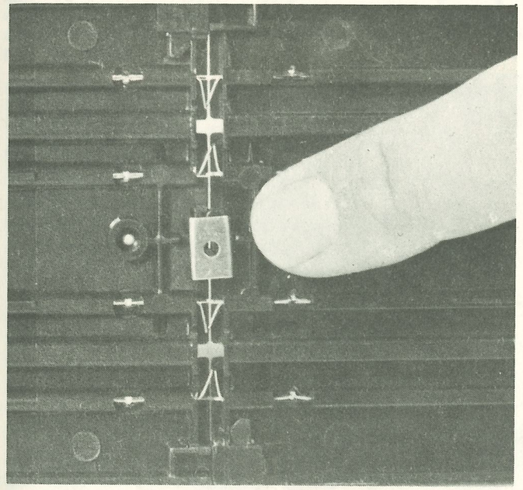

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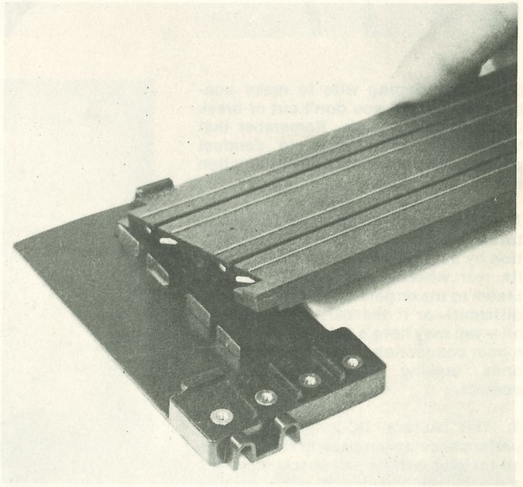

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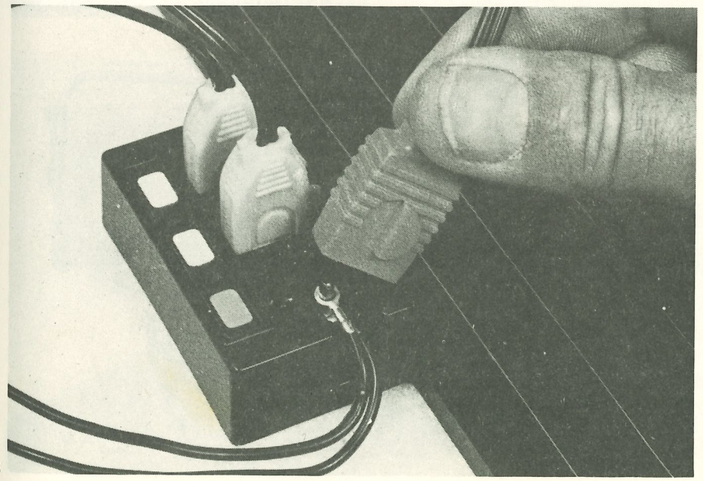

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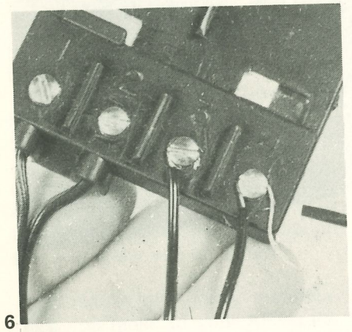
1. The rail-ends are the most critical part in track assembly. Check them all, making sure they're bent to the right shape to make good contact. These bring power to the car and are VERY important.
2. Snap the track sections together, a few at a time, using this No. 1590 track tool supplied with sets or available separately.
3. Track clips aren't necessary, but come in handy should you break off any track locking-tabs. Rotate the clips 90 degrees to use them on banked sections.
4. Fitting the terminal track to the layout is a bit of a challenge, the first time you try it. Hold the terminal in your left hand and fit the right-hand track section first. Snap! It's in place. Note that the brass strips must touch the rail-end tabs: This is where contact is made—or lost!
5. Hooking up the power packs, controller using the plug in system is quick and efficient! Even the "brake" line is easy to hook up!

tion Tool and Track Tester No. 1589. Hold the controller ON and press the tool against the track rails, one section after another. If you have power, the tool lights up. If you don't have a tester, have someone hold the controller ON for you while you use one of your AFX cars to check the track. Touch the car pickups to the rails, moving from section to section, and listen to the motor. If it doesn't run, or runs slowly, you have a problem. It's usually the track tabs and you'll have to disassemble the track and adjust them for proper contact.

Track rail-height is often neglected but it's extremely important to fast running. Through normal use and production variances, the track rails may work up and cause inconsistent contact with the pickup shoes resulting in poor performance. The problem is aggravated with Magna Traction and G-Plus cars since they hug the rails with magnetic 'downforce'. Correct this



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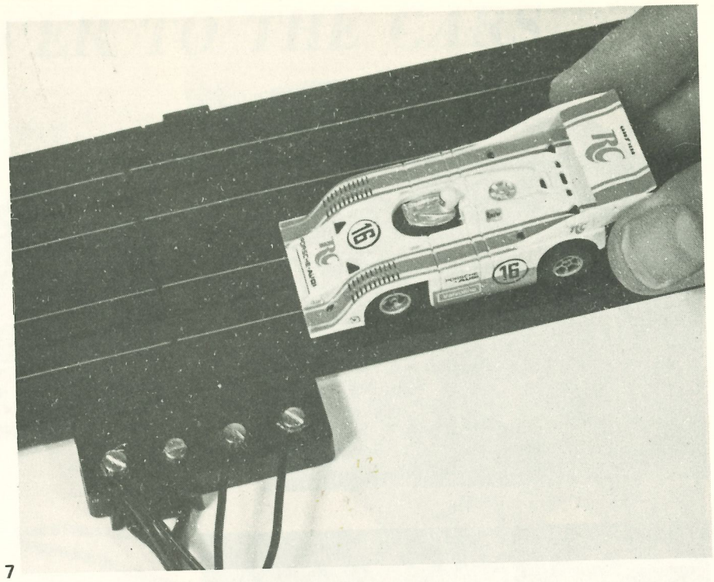

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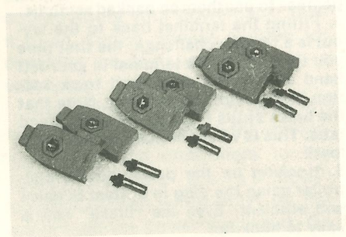
6. When stripping wire to make contacts, be careful you don't cut or break the individual strands. Remember that the wire must be bare to conduct power, and make sure each connection is tight and clean.

7. Plug in the power pack, hold the controller full on, and test each track section by holding the car on the lane with its rear wheels clear of the surface. Listen to the engine revs: If the sound is different—or if the car doesn't run at all—you may have a voltage loss due to a poor connection. Check the track railends. making sure they're in firm contact.

8. This Aurora DC-2, No. 1444 hi-performance power pack is recommended for long layouts and special cars. It's a worthwhile investment, either for new layouts or as a replacement for a worn-out Wall-Pak. The DC-2 has an on-off switch and a maximum output of 18 volts DC. Its rated at 12 volt-amps (VA).

9. The "Wall-Pak" is supplied with sets, comes with a terminal section connected. It plugs directly into a wall outlet, has a 14-volt DC output. Rating is 7.2 VA DC. You can also purchase a set of plugs (below) to convert old controllers and power packs.



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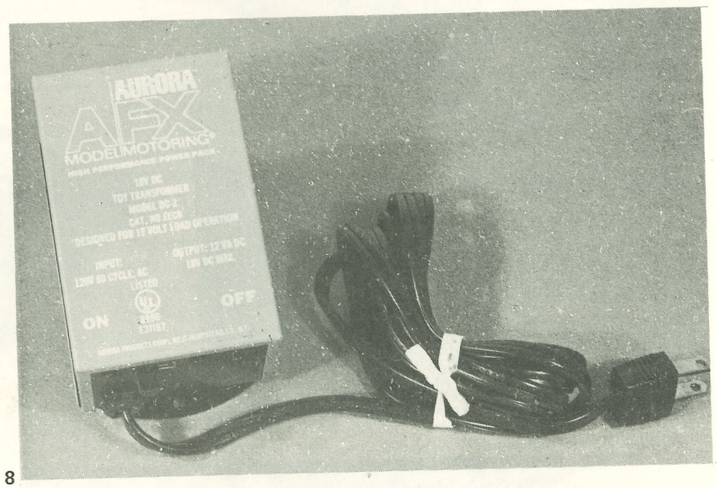

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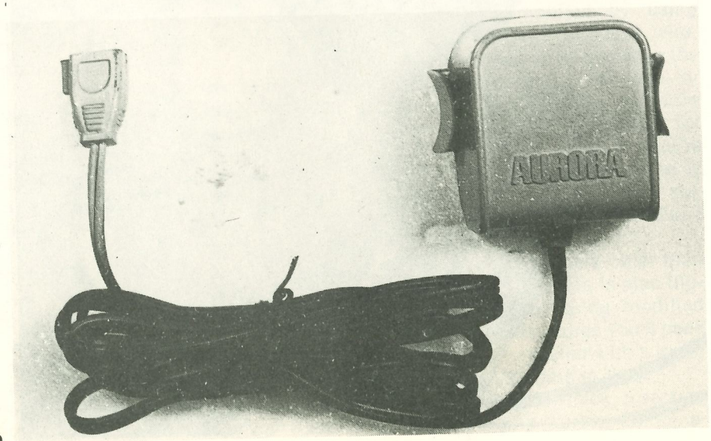

10. Due to manufacturing tolerances and normal use, track rails may pop up and extend beyond the .015-inch recommended height. Magna Traction and G-Plus cars are most affected, but any car will lose performance on uneven rails. Check each track section using a mechanics' feeler gauge.

11. Level the contact rails using a 1-inch by 2-inch by 2-inch block of wood and a hammer. With the track section on a firm surface, tap gently until the rails are level. If any are below the proper height, push them up from underneath, using a screwdriver.

12. "Dust Rust Must Go" No. 2596 by Aurora is a track and rail cleaner and preservative. Just a small amount on a lint-free cloth goes a long way in keeping your track in top condition. Never use 'tire goop'; it's not necessary. Clean your cars' tires by running them over the adhesive side of masking tape.

13. Aurora's Combination Track Tester and Tool assembles track, checks for rail continuity by lighting up, and has a screwdriver and a wrench built in. Its part No. is 1589.

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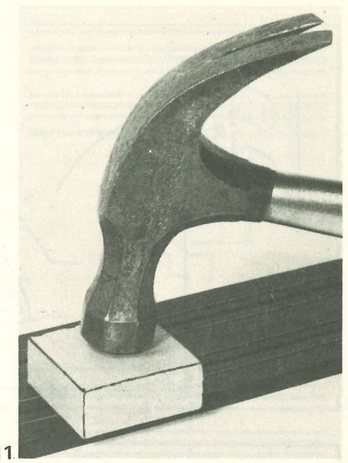

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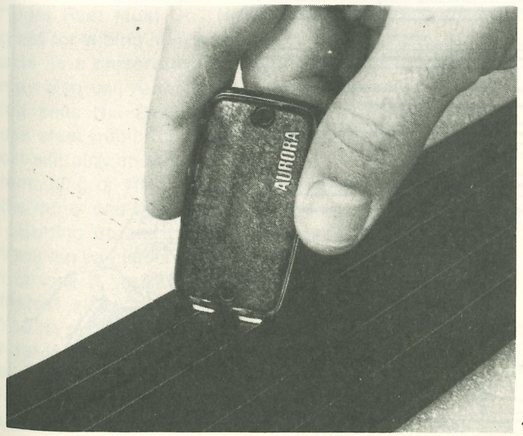

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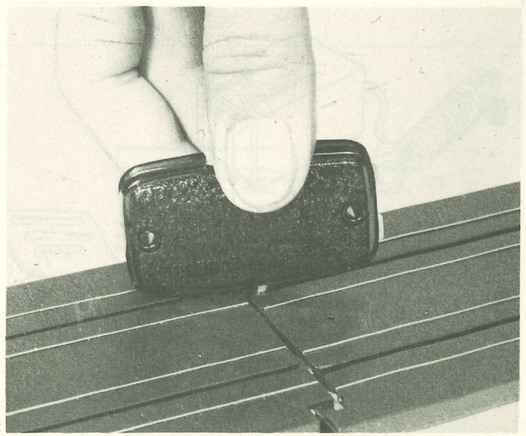

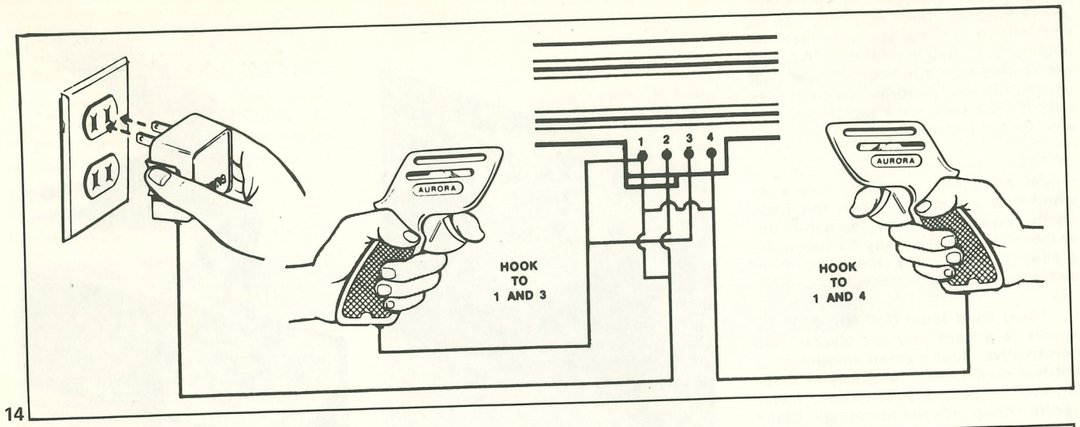

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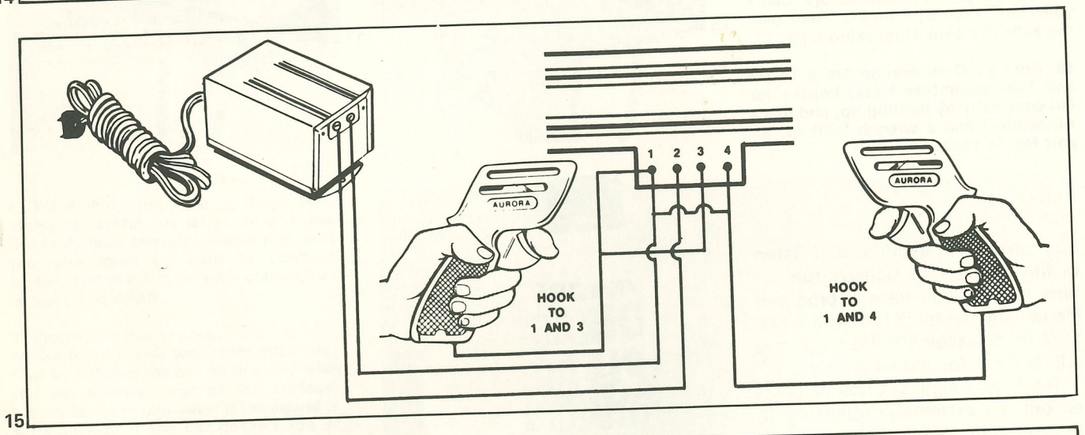

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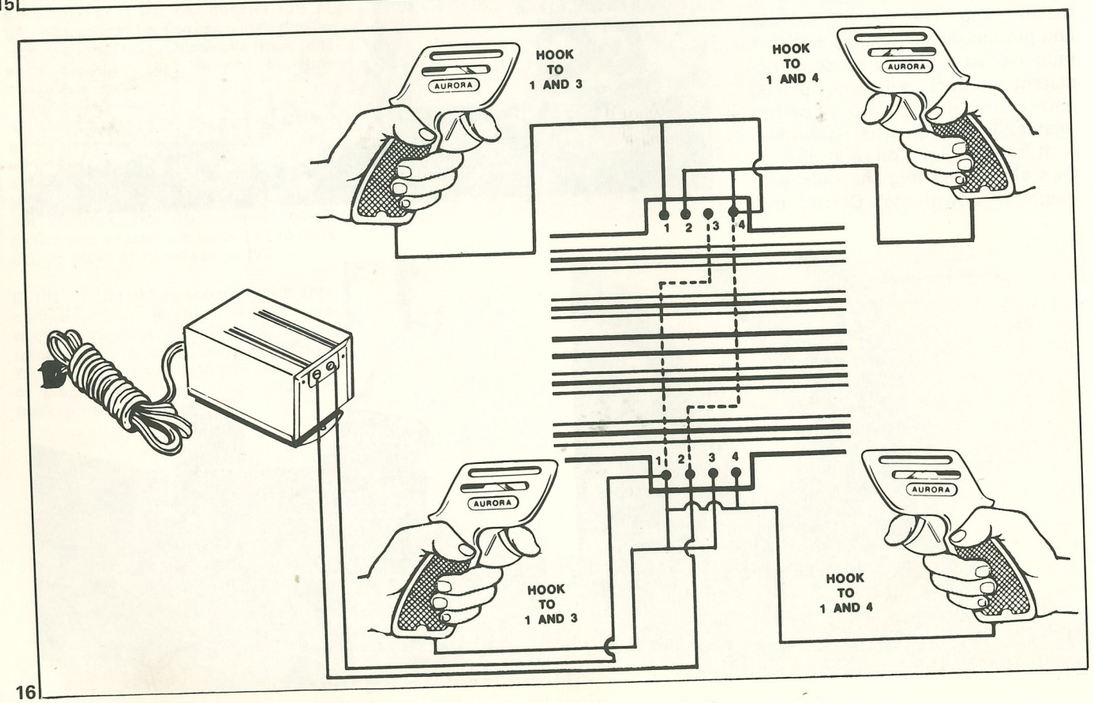

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14. WALL-PAK TWO—LANE HOOKUP
This is a simple two-lane hookup using the Wall Pak. Since the pack wires are already connected to the terminal track, you need only add the controller wires in the manner shown. Note that No. 1 terminal is common to both lanes.

15. HI-PERFORMANCE POWER-PACK TWO-LANE HOOKUP
Connect pack wires to terminals 1 and 2, then install controller wires as shown. Follow this diagram to wire a pack to each pair of lanes on a four-lane track for more power. This is especially recommended on tracks similar to the "Clubman" layout.

16. HI-PERFORMANCE POWER-PACK FOUR-LANE HOOKUP
In this diagram, one pack is used to supply power to both tracks of a four-lane layout. You'll need another No. 1555 terminal, running the wires under the track. Be careful when wiring: The wire from No. 1 terminal goes to No. 2 on the second connector, and that from No. 2 to No. 1. Since the second terminal is on the opposite side of the track, a 1-to-1 and 2-to-2 hookup would make the cars run backwards.

17. JUMPER WIRING FOR LONG TRACKS
Power losses through the rail-ends make this system desirable. Regular hookup wires to a set of terminals halfway around the track will overcome these losses and provide better running all the way. Note the correct way to add these jumpers, as an error will cause a short circuit.

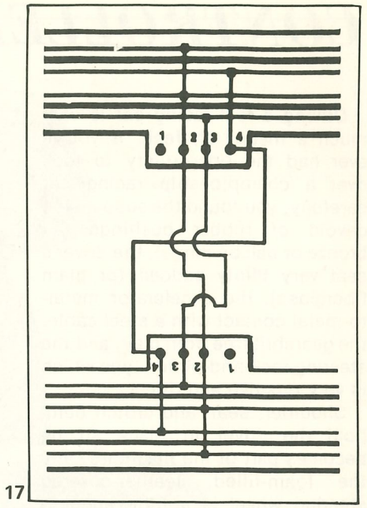
condition by using a 1-inch by 2-inch by 2-inch block of wood and a hammer. Tap the rails down until they extend .015-inch above the track surface. An auto mechanic's feeler-gauge might be the best way to check this accurately.

Clean track is important, and make sure the rails are free of rust. A carborundum track eraser or fine 500- or 600-grit sandpaper may be used to polish the rails. Aurora's "Dust Rust Must Go" No. 2596 is great for wiping rails and track, and acts as a preservative as well. You may also use Aurora's track cleaning pads No. 2595. NEVER, never use steel wool! The magnets in the car will pick up strands of the wool remaining on the track and destroy the motor and the gears!

Setting up and maintaining your track isn't a glamorous job but it's a vital one if you want to enjoy the fastest racing you've ever done. You've probably heard real drivers refer to "fast tracks", "slow tracks", and "dirty tracks". The ones they like best are "fast, ultra-clean tracks". Keep yours that way!

18. AURORA—RUSSKIT, AURORA 'CONTROL PLUS', AND SIMILAR CONTROLLERS WITH BRAKES—
Controllers with brakes require a third wire to close a circuit across the two power rails when the contact trigger is released. The armature in the car's motor must then turn against a 'shorted' field, stopping the car more quickly. Here's the proper hookup for these controllers. The red brake wire is connected to terminal No. 2.

19. POWER LOSSES FROM WALL TO CAR
Resistance in the wiring, connections, steel rails, rail-ends, dirt, and corrosion all add up to power loss. The more of this you can control or eliminate, the more power you'll have available to race!



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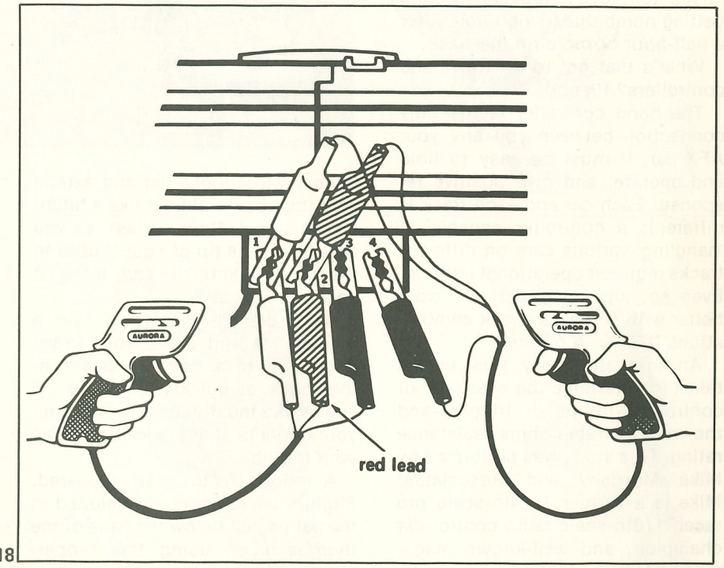

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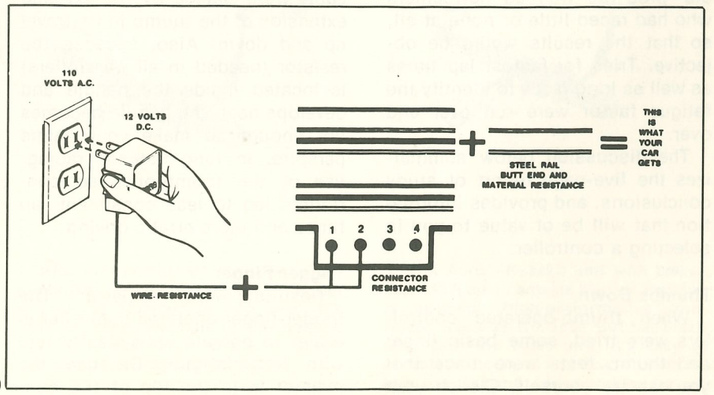

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CONTROLLERS - A SECRET STUDY

Driving a real racing car is very much a matter of 'feel'. If you've ever had the opportunity to look over a championship racing car carefully, you found the suspension devoid of rubber bushings (all bronze or ball bearings), the driver's seat very thinly padded (or plain fiberglass), the accelerator metal-to-metal contact with a steel cable, the gearshift free from play, and the steering rack-and-pinion type which is very positive and direct.

Shoulder, seat, and crotch belts hold the driver in place so he becomes part of the machine. Only the foam-filled, leather-covered steering wheel is a little spongy: That's to prevent his hands from getting numb due to vibration, after a half-hour or more on the track.

What's that got to do with hand controllers? Plenty!

The hand controller is the only connection between you and your AFX car. It must be easy to hold and operate, and give positive response. Each car and each track is different; a controller capable of 'handling' various cars on different tracks required operational latitude. Even so, any controller will work better with some car/track combinations than with others.

An in-depth study was undertaken to determine the best type of controller—thumb or trigger—and the most suitable ohms resistance rating. This study was performed by Mike Morrisey and Associates: Mike is a former 1/24th-scale pro racer, 1/8th-scale radio control car champion, and well-known magazine writer. The tests were made by old 'pros' as well as newcomers who had raced little or none at all, so that the results would be objective. Tries for fastest lap times as well as long races to identify the fatigue factor were run over and over.

The discussion below summarizes the five-page report of study conclusions, and provides information that will be of value to you in selecting a controller.

Thumbs Down

When thumb-operated controllers were tried, some basic finger and thumb tests were made that you can try yourself. Clench your fingers into a loose fist and extend your thumb straight out like a hitchhiker's signal. Now, as fast as you can, touch the tip of your thumb to the second knuckle and bring it back up.

Next, clench your hand into a regular fist and move your index finger out to a pointing position, then back, as quickly as you can. If you're like most people, you'll find your finger is about twice as fast as your thumb.

A fatigue factor also appeared. Slight muscle cramps developed in the palms just below the base of the thumbs when using thumb-operated controllers; these cramps probably were caused by the extreme extension of the thumb in its travel up and down. Also, because the resistor (needed in all controllers) is located inside the handle and develops heat, the handle becomes hot enough to make your palms perspire. In long-distance racing, use of the thumb-operated controllers led to less consistent lap times and more erratic driving.

Trigger Finger

Results were decisive: The trigger-finger-operated controller is easier to operate consistently and with less fatigue. Because the resistor is in the top of the controller, little or no heat was passed through to the hand. Both beginners and experts were able to control the car better and, even though the experts were faster on the track, the lap times of both groups of drivers were decidedly faster than with the thumb-operated controllers.

Basics of Slot-Racing Electricity

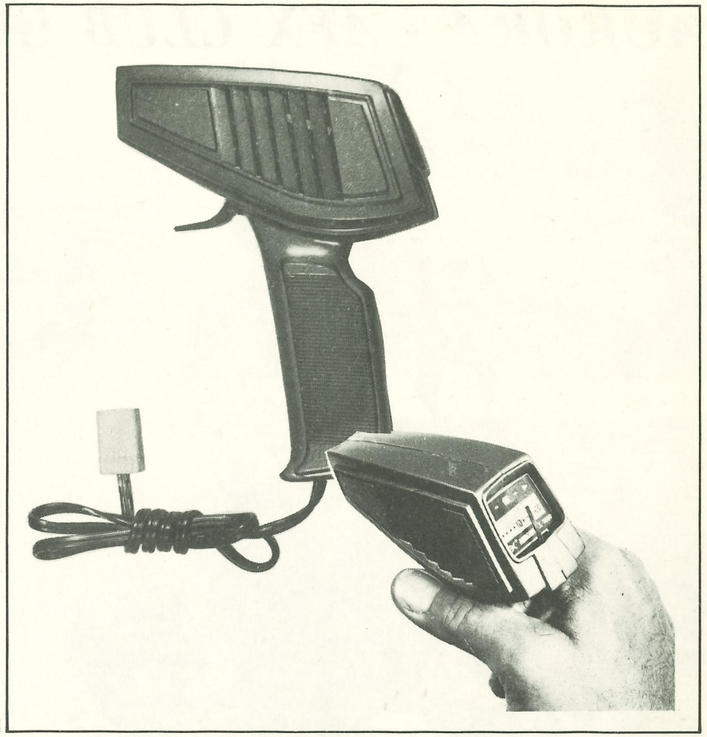
Slot-car motors are designed to 'draw' a given number of amperes (amps) of current at the output voltage of the power-pack when running at top speed. To reduce speed, you must reduce voltage—the function of the resistor in the hand controller—and this, in turn, reduces the number of amps flowing through the motor, slowing it down. Thus, the controller increases or decreases current flow just like the gas pedal in a car controls the flow of gas mixture to the cylinders The resistance (in ohms) of the resistor is determined by the amount of current the motor draws, the length of the track, the number of curves, and other factors. You increase or decrease resistance by moving the trigger finger, making the car's motor go faster or slower.

Racing cars require full power in the straights and when accelerating; less power to get them through the turns. In the early days of slot-car racing, handling was poor and speeds varied from very slow through the turns (cars deslotted easily) to the very fast down the straights. Due to this great range in speeds and the electrical characteristics of the early motors, hand-controller resistors of very high ohm ratings—often 75 to 80 ohms—were required. Today, this is neither necessary or desirable. If you have new cars and old controllers, you can pick up performance by using the 'new breed' of controllers. AFX car racing technology doesn't stand still! At present, a 60-ohm rating is considered good for all-around racing, with more serious drivers preferring 30 ohms or less.

Brakes or No Brakes? That is the Question....

Controllers with brakes are identical to standard controllers except that they contain a built-in switch connected to a third wire. When you release the trigger, this switch closes and because of the way the third wire (red) is hooked up, you not only stop all current from flowing to your motor but you also turn the motor into a minuature generator as well, causing it to decelerate more rapidly. Strange to say, on some tracks and with some cars, it was easier to turn faster laps with the brake wire disconnected! This is probably due to rear-wheel 'lockup' causing skidding. Thus, whether or not to use brakes should be decided after tests to determine your lap times with and without them.

Yes, controllers are a big part of AFX racing. If you have wondered why Aurora controllers are made the way they are, now you know! Aurora's research and development team is working hard to bring you the World's finest miniature racing cars and equipment, and this was only one study of the hundreds conducted. Enough said!



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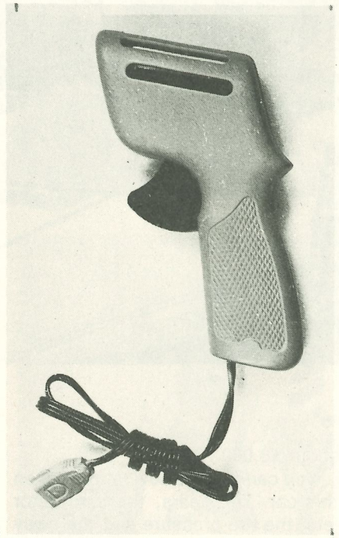

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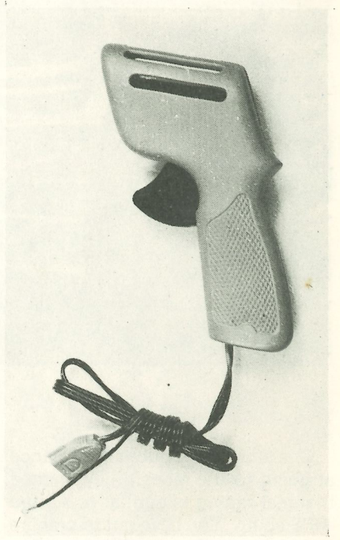

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1. AFX hand controller with speed indicator features a 60-ohm resistor. The needle on the top of the handle moves to top speed as the trigger is depressed. Easy to operate and control, it will not transfer heat to your hand.

2. AFX Aurora-Russkit controller without brakes (No. 1436) features a 60-ohm resistor, is standard in AFX sets. It's easy to operate and control, has no heat transfer to your hand, and is an excellent choice for regular racing.

3. AFX Aurora-Russkit unit with brakes (No. 1437) also contains 60-ohm resistor, is optional 'high-performance' controller. Same as No. 1436, but has brake wire. Like the basic unit, it's easy to operate and control and doesn't transfer heat to your hand; added braking feature allows faster racing.

AURORA - AFX CLUB GOES RACING

One lucky AFX club had a chance at going to the races. They learned that real racing is similar to Aurora AFX racing. You have got to prepare the car, understand how it handles and why and make sure everything is working correctly.

This is a Formula Ford car. One driven in SCCA Sports Car Club of America Road Races. It's powered by a small Ford Pinto type engine and hits speeds of 130 MPH. It is a class of car where many new drivers get started in racing. They cost about $8,000.00.

You can change several things on this car. The gears, the carburator jets, the tire pressure and the sway bars to attain maximum performance on the various tracks they race on.

There are many different types of races and cars running in thousands of races annually all over the world. Aurora AFX does not make a model of a Formula Ford, as it is considered to be a "training car". They do make models of practically every major racing series car, so that you can duplicate practically any racing series in the world including the World Championship Grand Prix.

Because the bodies are made of plastic, you can modify them even further, scratch build your own, or race "just plain stockers".

If, and when, you get to the races, you'll find most of the drivers ready to talk to you about racing, especially if they know you are an AFX racer.


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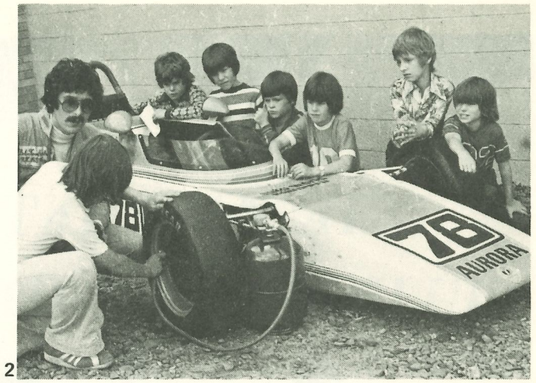

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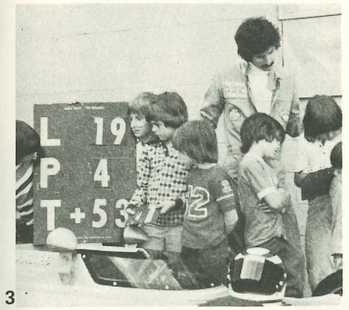

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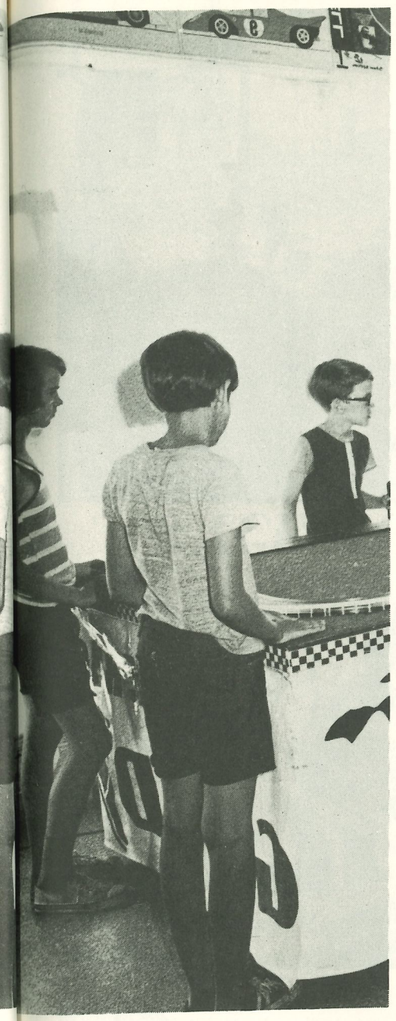
1. Setting up the car with a weight measuring device. This device measures the load on each tire. By adjusting the springs, you can jack the weight around to improve road holding. Driver, Bob Koveleski, explaining how it works.

2. Tire pressure is critical. Tire pressure is adjusted just before the race because racing tires tend to leak air. All racing tires are measured around the circumference for size. Many of them vary from 1/8" to 1/2".

3. The pit signal board. L means the lap you're on. P means your position in the race. T means your Lap Time or if shown with a + on the board like here—how far ahead of your nearest competitor. In this display, you are 53 seconds ahead of him.

4. Keeping lap times and score is important. That way you know if you are getting better or worse, or if the changes you made in the car's suspension helped or hurt lap times. Winning is a lot of work, but worth it! Plus, you have to know what you are doing!

5. Safety equipment. Fireproof clothing, helmet, seat belt and shoulder harness are all important in case of a collision. These are all mandatory and inspected every race. Around the track, many corner workers provide flag control and are First Aid trained. Doctors, nurses, ambulances and special safety vehicles are all part of a race. That is why, it's the only place to go fast safely.



While you, as an AFX hobbyist, can find many things to do—such as building and adding on to your track layout, working on your cars, and trying out new ideas, it's a lot more fun when you have a club and hold races. If you have a track running all year, maybe others do too. Why not get together, hold races at different places, and work up a seasonal championship?

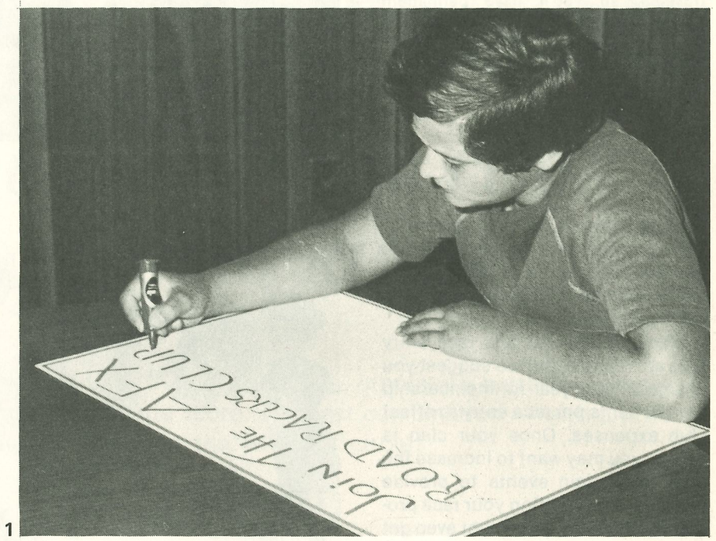
The easiest way to get a club going is to start one yourself. How do you find members? Well, your best bet is to hand-print some posters. To make them look professional and exciting, you can add racing pictures cut from magazines. Put up these posters where potential members are likely to be found, such as on the bulletin boards at work or school, local food stores (many have bulletin boards), and at your friendly local hobby shop.

On the poster, ask interested people to contact you by phone or postcard so you can get their names, addresses, and phone numbers. You'll want about ten or fifteen prospective members at first, and then hold an initial meeting. The best place to have this is one that's easy to get to and which most people know, such as your hobby shop, school or garage.

At the first meeting, club officers should be chosen or voted upon. You should be the 'Chief Executive' to get the club going, and act as club director and chief steward. Your duty is to manage the club and the race program with impartiality, fairness, and good sense.

The club will need a 'Chief Timer and Scorer', which is a tough job. This fellow's responsibility is to time accurately the qualification runs, post results, and prepare the

START AN AFX ROAD RACING CLUB



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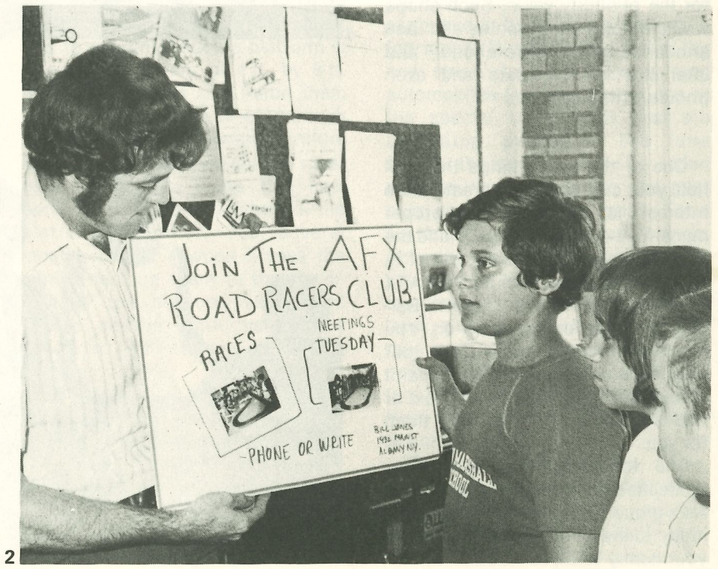

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1. Pick up some poster-board at your local art-supply shop and hand-print a few signs. They needn't be fancy—Just be sure to include all the necessary information. Use those colored felt-tip pens to make your signs eye-catching, and paste on some photos of your track.

2. Put up your signs where they'll be seen by prospective members. Your friendly AFX dealer should be your first stop. The school bulletin board, local sports car club, even McDonalds, are all good spots. Write a letter to the sports editor of your home-town newspaper: He might do a story on your club.

3. Be sure your name, address, phone number, and hours to call appear so that interested people can contact you. When they do, make a list of their names and addresses so you can let them know how the club is shaping up.

4. At the first meeting, outline your club plans, get ideas from members, and schedule your races. Appoint or elect officers, establish club rules. Club management is a lot of fun.

5. Club racing—the most exciting AFX sport of all! Here's a chance to pit your cars, driving ability, and wit against those of fellow members. Stopwatch timing allows recording of distance traveled, so you'll have permanent records to be challenged every time you race. Remember: To get started, all it takes is some initiative and a few signs!

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final race results for publication.

One other officer is needed, a Secretary/Treasurer to handle race announcements, money, and club correspondence.

Membership fees and race entry fees are flexible, but we suggest you charge $1.00 a year for membership plus 50 cents per race entry to offset club expenses. Once your club is rolling, you may want to increase the fees for certain events to provide trophies. After getting your race programs underway, you might even get local businesses to sponsor races for the publicity value. Such shops would display the trophies and race announcements beforehand, and later the winning cars and even photos of the drivers.

One of the main things that will help your club grow and create more interest is choosing the proper name. You might want to include the name of your city or a section of it, as in "AFX Racers of Indy", "AFX Road Racers of NYC", "Santa Barbara AFX Racers", and so on. You can think of dozens more. Once your club has a name, you can hand-paint some T-shirts for the competitors or find someone who'll provide them for you.

The foregoing are just a few guidelines to help you get started. As a group, you'll be able to develop many ideas to increase interest in your hobby and your club.

RACE COURSE PREPARATION AND RACING RULES

Some AFXers are better drivers than they are builders, others are better builders than they are drivers. Racing evens up the score. The best combination — with a little luck — winds up in the winner's circle!

Two lanes, four lanes, or six lanes may be used in AFX road racing. Four-lane racing is the most exciting, six-lane the most difficult. We'll talk about the four-lane program first, then explain how to run the others.

PREPARING THE COURSE

Regardless of how many lanes you run, the most important consideration in model car racing is assuring a fair race for every driver. Once your basic layout is constructed, three more things are needed to prepare it for racing:

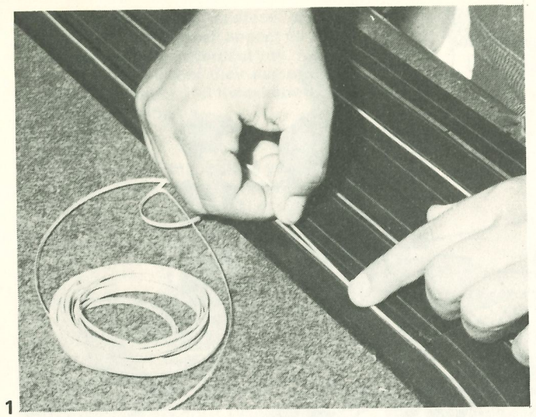
(1) Lap counters such as Aurora's.
(2) Color coding of the lanes.
(3) Numbering of the track sections.

You'll need a good platform to race on, one that's solid and stable enough to hold the track in position and not topple over when the turn marshalls are at work. The simplest way to construct such a platform is to use two sheets of 4 ft. by 8 ft. half-inch plywood and frame them with 1-inch by 4-inch or even 2-inch by 4-inch lumber. Standard furniture legs and mounts, available at most hardware stores, make fine supports. To join the two halves of the platform together, use several lengths of 1 x 4 wood across the joint, attaching them to the underside of the plywood with wood screws so the platforms can be separated for storage or layout redesign.

After setting up your track, select the best spot for the start/finish line and install the lap counter at that point. Most races are run clockwise on road courses, so be sure the counters are installed to operate in the proper direction.

Lane color-coding may be done by painting a stripe all the way around each lane or by using colored marking tapes. These may be either the 'pin stripe' tape sold for striping automobiles (and models) or one of the special track tapes that are becoming available. The lane nearest the drivers should be coded red, the next lane white, the next blue, and the final one yellow. For a six-lane track, add green and orange. Actually, you could use any colors you wished but it's best to follow the above standard pattern so your track will be like others you may race on. Incidently, the reason for color-marking the lanes is that the turn marshalls can recognize color more quickly when replacing deslotted cars.

Because lane lengths differ, timers and scorers must determine how far each car ran in the allotted time in terms of laps and number of track sections completed. To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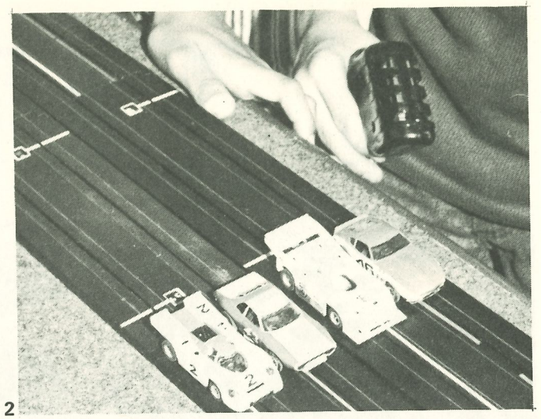
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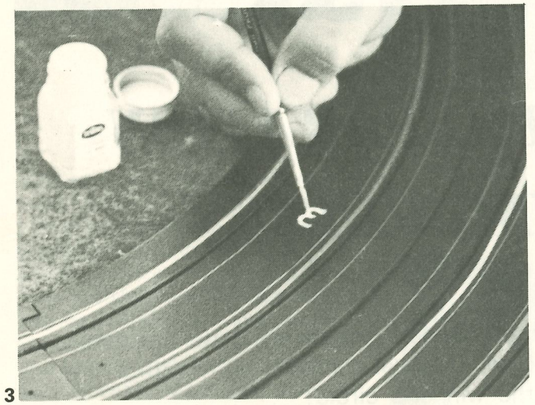
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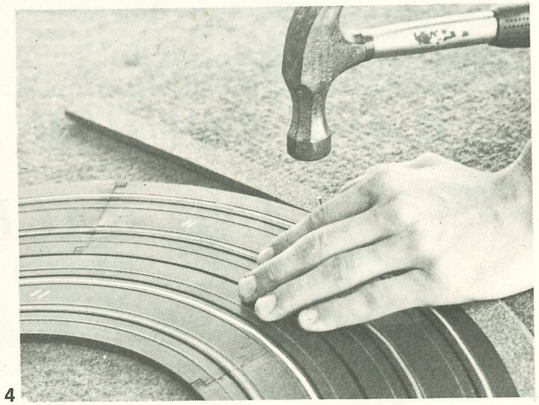
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simplify this task, number each section of track whether it's two, four or six lane. Begin with the first section after the lap counter and proceed around the track in a clockwise direction, numbering the sections "1", "2", "3", etc. You can paint the numbers on the track, use decals, or employ the press-on numerals found in hobby and art stores.

If you've assembled and wired your track correctly, you'll have a course you can be proud of once you've completed the above details. Such a track will be enjoyed by all drivers and will be an easy one on which to run a fair race.

CLASSIFICATIONS

In the interests of fairness and maintaining enthusiasm, it's essential to classify drivers by ages and cars by type. The classifications listed here are only suggestions; you may adopt them 'as is' or modify them to suit your own club's needs. You should, however, always keep a 'novice' or beginners' program going. If you make racing too difficult for the newcomers, you'll soon run out of members. That's why real-car clubs like SCCA, USAC, and NASCAR have racing programs for newcomers, and various car classes such as 'Formula Vee', Formula Ford', 'Showroom Stock Sedan', and sports cars.

Whenever at all practical and possible, break down the age groups early in the growth of your club so that distinct groups will develop. One suggested grouping is:

A. Drivers up to, and including 10 years of age. They move into the next group on 11th birthday.

B. Drivers up to, and including 14 years of age. They move into the next group on 15th birthday.

C. Drivers 15 and over.

Special events, such as "Father and Son" team races, and races between teams made up of fastest and slowest qualifiers, can add much interest to your programs. In team events, laps and sections of track completed by the two drivers are totalled and compared with those of the other teams to see who won.

Or, you might try racing the "A" group against the "C" group as a challenge, with or without a handicap.

Classifying cars into competitive groups will also help to maintain interest.

The following suggested classes are based on the current series of AFX cars. When new cars are introduced, additional classes may be needed.

AFX GROUP I—Stock Aurora AFX Magna Traction cars with no changes whatsoever. See below for "claiming races".

1. Applying striping tape of different colors to identify the lanes so the corner marshalls can quickly return deslotted cars to the proper lane. Pinstriping for cars works well, or see your dealer for track striping tape.

2. Install the lap counters just ahead of the start-finish line. These only count up to ten laps but repeat automatically, so you'll need an observer to make sure the count is right when you run longer races.

3. Number the track sections beginning just after the start-finish line. Paint on the numbers, or use press-on type available at art stores and some hobby shops. These section numbers are used in scoring each race.

4. If you'd like 'slide-out' areas, purchase some HO-scale model train cork roadbed and nail it around the outside of selected turns.

5. Sign up your drivers on the qualifying sheet. Make up these sheets in advance and keep the completed ones in your club files. Records like these will help you plan future handicap and class races.

6. Each driver writes his name on a slip of paper and drops it into a hat. Draw the slips out, one by one, to determine qualifying order.


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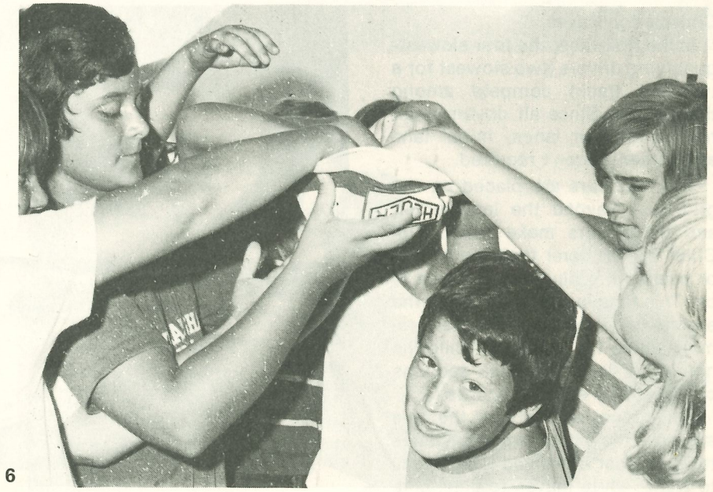
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AFX GROUP II—Stock Aurora Super Magna Traction cars with no changes whatsoever. See below for "Claiming Races".

AFX GROUP III—Stock Aurora AFX G-Plus cars with no changes whatsoever. See below for "Claiming Races".

AFX GROUP IV—Any Aurora AFX car modified in anyway, except the stock chassis and pickup system must be retained. Overall width must not exceed 1- 5/16" and only the tires, pickups and guide shoes are permitted to touch the track.

To enforce the 'no modifications' rule in Groups I, II and III, it's suggested that these be held as 'claiming races' in which any club member may buy a winning car from its driver for the regular retail price plus 50 cents. You'd be surprised how well this device, used in big-car racing as well, serves to "keep honest people honest"!

RACING RULES

Qualifications

To establish an order for qualifying, each driver draws a numbered slip of paper out of a hat. Use only the red lane for qualification runs and station enough turn marshalls on the corners so that everyone has an equal chance. Don't rotate turn marshalls: They become proficient at working the turn where they're stationed.

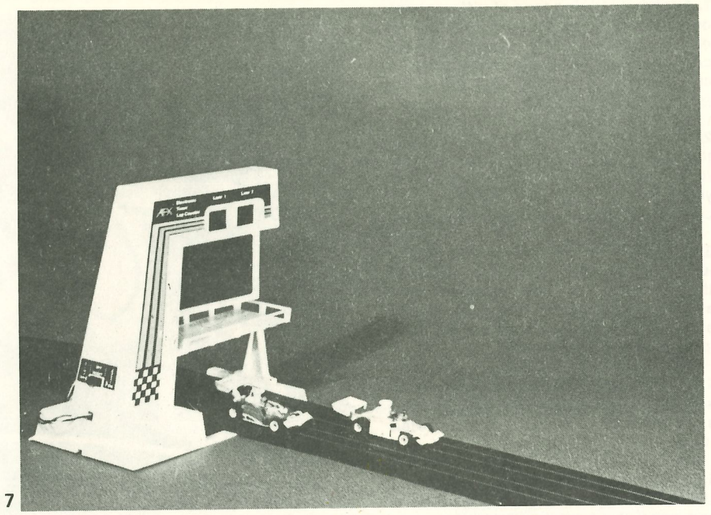
The Chief Timer and Scorer is responsible for all qualifications. He'll need a watch like a stopwatch, or an Aurora LED Lap counter and Lap Timer. Using the Aurora AFX Lap Timer is easy. Each driver just runs for 10 laps or so, and takes his best lap time. If you have to work with the stopwatch or regular watch, the following procedure works best.

The first qualifying driver places his car on the grid with his controller ready to go. The Chief Timer and Scorer flips on the power switch or pushes in the powerpack plug; 60 seconds later he cuts off the power, by **his** watch. He then determines how many laps and how many track sections were covered during the run. (Now you can see the necessity for numbering the track sections in the direction the cars are running.) He then lists the driver's name and car (you must race the car you qualify with) with the distance covered during the 60-second run. This is repeated until all drivers have qualified. Some clubs allow two qualifying runs for each driver, using the best run to assign qualifying position: This is a good idea, if you have the time.

The Chief Timer and Scorer now lists the drivers according to qualification distance covered, the fast-

est driver first, the second fastest next, etc. If he has kept the qualifying scores on separate slips of paper or cards, it will be easier for him to merely rearrange them in order, especially if there are 15 or more drivers.

The next stage involves running a series of preliminary races, similar to the 'heats' used in real car racing, to determine which drivers will appear in the 'feature'. This provides far more racing in an evening than does an "Indianapolis 500" type of event in which perhaps 80 drivers try to qualify and only 33 ever make the race. In addition, as you'll soon see, the six fastest qualifiers don't get as much track time in these races as the slower drivers do. Thus, the latter have more opportunity to improve their performance.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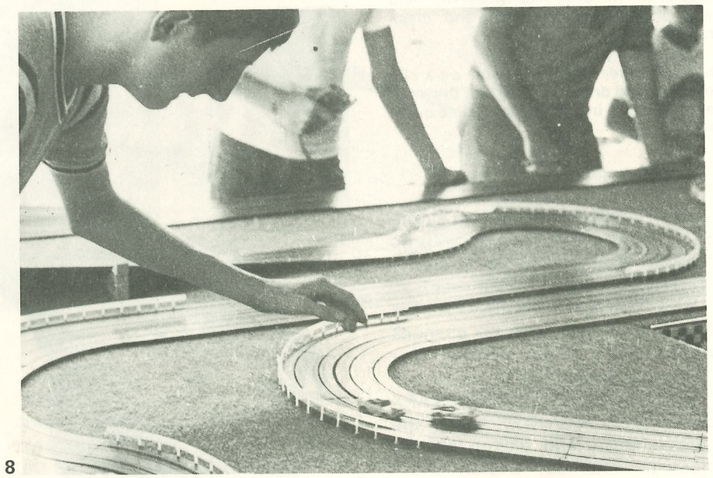
Consolation Races

In the first race, the four slowest-qualifying drivers (two slowest for a two-lane track) compete among themselves. Since all drivers must run on all four lanes, initial lane assignments aren't required.

The four cars are placed on the grid, just beyond the lap-counter, and the drivers make ready. The Chief Timer/Scorer flips the switch or pushes the plug and the race is on! This time, power is cut off at the end of **two** minutes. The cars remain where they stopped while the number of laps and track sections completed by each is recorded.

Since lane lengths vary, the cars are now moved to adjacent lanes thus: The car in the red lane moves to white, white moves to blue, blue moves to yellow, and yellow goes to red. This is repeated two more times, until each driver has competed on all four lanes. The numbers of laps and track sections covered by each driver in each two-minute run are then totalled and the driver covering the greatest distance in the eight minutes of racing is declared the 'winner'.

The winner of the first 'consolation' race then challenges the three drivers who were fifth, sixth and seventh (from the **bottom**) in qualifying scores: The second race is run in the same manner as the first; the winner then moves on to the next race and so on, until all drivers except the six who were fastest in qualifying have run in a consolation race. Those top six don't compete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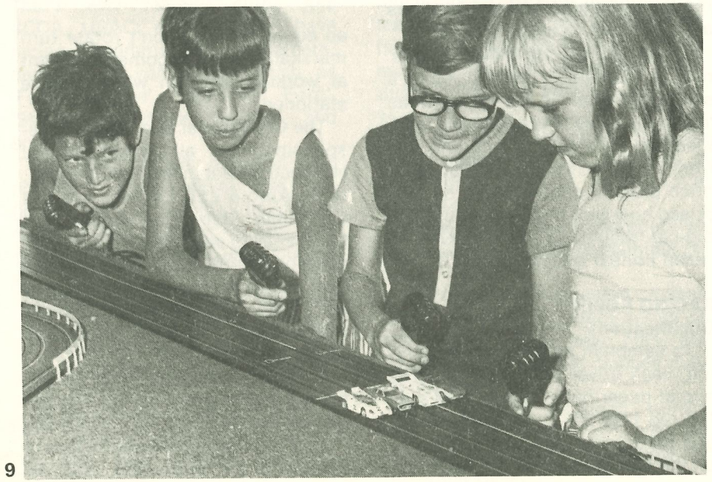
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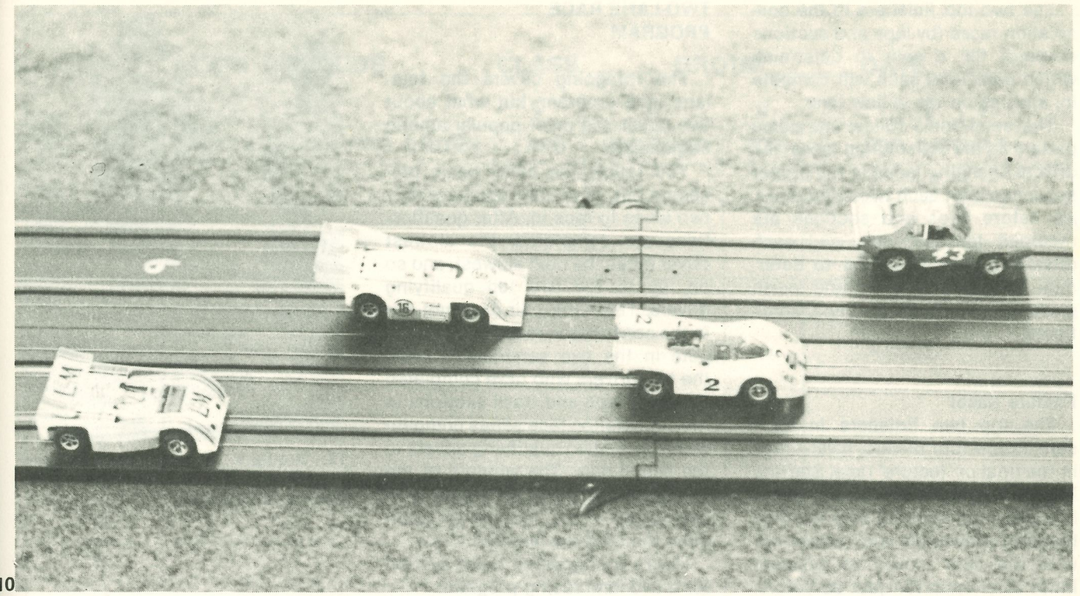
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7. The Aurora AFX LED Lap Timer and Lap Counter makes keeping score at the races easy. Fully electronic, it works automatically as the cars go by. It times to 1/10th of a second, with great accuracy.

8. Assign a corner marshall to each turn, and don't switch them about. A marshall "learns" his turn, giving each driver the same chance. Corner marshalls must be fast!

9. Drivers race each other based on their qualifying positions, as they advance from consolation races to semi-finals to the feature. Guys and gals get the same 'even-steven' treatment.

10. When time runs out, the power is shut off, car positions recorded, and each driver moves to the next line. This way, every driver has a chance to run in all the lanes, important because lane lengths vary on most layouts.

11. Use the 'Heat Forms' to record type of race, drivers' names, and number of laps and sections covered by each. This eliminates any chance of error and provides a permanent record of each heat. Any confusion should be resolved before the next heat begins.


11

until the semi-finals.

If you reach a point where you don't have three drivers remaining to compete against a consolation race winner, pick the top two or three in the race just finished.

Semi-Final Races

Each of the six top qualifiers is guaranteed a starting position in one of the two semi-finals. Split them up this way:

Lane	First Semi-Final	Second Semi-Final
Red	1st qualifier	2nd qualifier
White	2nd qualifier	4th qualifier
Blue	3rd qualifier	6th qualifier

The two top finishers in the consolation races (by laps and sections covered) flip a coin to determine which semi-final each will compete in, starting on the yellow lane.

The semi-finals follow the same pattern as the consolation races, the drivers changing lanes in the proper sequence after each two-minute run. As before, laps and sections are recorded for each run, and each driver's distance totalled to determine first, second, third, and fourth places in each of the two semi-finals.

Feature Race!

The top two finishers in each semi-final—four drivers, total—race in the final or 'feature' race. Starting lane assignments are drawn from a hat. Each run lasts for **four** minutes between power-on and power-off, with the cars moved to adjacent lanes after each run just as before. Thus, the 'feature' runs a total of 16 minutes actual racing time.

The final winner is, of course, the driver who completes the greatest distance in laps and track sections during the entire race.

Points and Series Races

To keep interest at high pitch from race to race, a championship point series can be established with points awarded each racing night to drivers competing in the semi-finals and feature race. Trophies for the top point-scoring drivers of a six-race 'championship series' or for most points accumulated over a six-month period are an excellent incentive to spur competition, encourage improvement in racing skill, and keep club activity at a high level.

Here's one point system for you to consider:

Feature winner—100 points
2nd in feature—90 points
3rd in feature—80 points
4th in feature—70 points
Semi-final 3rd—40 points
Semi-final 4th—30 points

You'll notice that no points are awarded to the first and second place finishers in the semi-finals, because these drivers compete in the feature race and are guaranteed points for finishing regardless of place.

TWO-LANE RACE PROGRAM

The foregoing covers the four-lane race program, but what about two lanes, the most popular among beginners?

You follow the same basic procedure but, of course, you have only two lanes to race in. After qualifications are completed, the slowest driver races the next slowest, and so on, up to the **two** top qualifying drivers. The latter pair does not run in the consolation races but do compete in the two semi-finals. Thus, the two drivers who have completed the most laps and track sections in the consolation race series compete with the top two qualifying drivers in the semi-finals. The winners of the two semi-finals then compete with each other in the 'feature' to determine the ultimate winner.

Here's a suggested point system for a two-lane racing program:

Feature winner—100 points
2nd in feature—90 points
Semi-final 1st—70 points
Semi-final 2nd—40 points

(Special note on points: The two top drivers who move into the feature give up any points that they may win in the semi-finals, since they are guaranteed 100 points for first and 90 points for second in the feature. No points are awarded in consolation races.)

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12. Brothers, sisters, mothers, and fathers all race AFX, so plan on having classes for everyone.

SIX-LANE RACE PROGRAM

If you have a six-lane track, you again follow the same general format as in the four-lane program. However, the slowest qualifying driver races the next five drivers in the first consolation race, and so on up the scale.

The top **eight** qualifiers don't run in consolation races, but secure the right to start (four each) in the two semi-finals. Split them up this way:

Lane	First Semi-Final	Second Semi-Final
Red	1st qualifier	2nd qualifier
White	3rd qualifier	4th qualifier
Blue	5th qualifier	6th qualifier
Yellow	7th qualifier	8th qualifier

The top four finishers in the consolation races (by laps and sections completed) flip a coin to determine which semi-final they'll run in and what color lane they'll start on.

Obviously, the feature race will be a competition among the three top drivers in each semi-final and is run in the same manner as a four-lane feature.

The following point system has been developed for a six-lane track program:

Feature winner—100 points
2nd in feature—90 points
3rd in feature—80 points
4th in feature—70 points
5th in feature—60 points
6th in feature—50 points
Semi-final 4th—40 points
Semi-final 5th—30 points
Semi-final 6th—20 points

Here, no points are awarded to the first, second, and third-place winners in the semi-finals because these drivers compete in the feature and are at least guaranteed points for finishing.

QUALIFICATION RECORDS CLASS _____ GROUP _____ DATE _____

A	B	C	D	E	F
QUALIFY	DRIVER QUALIFYING ORDER	LAPS	SECTIONS	POS	TOP DRIVERS
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

HEAT RACES DATE _____ CLASS _____ GROUP _____

☐ CONSOLATION ☐ SEMI FINAL ☐ FEATURE

FINISH	DRIVER	LAPS/SEC	LAPS/SEC	LAPS/SEC	LAPS/SEC	TOTAL LAPS/SEC

FINISH	DRIVER	LAPS/SEC	LAPS/SEC	LAPS/SEC	LAPS/SEC	TOTAL LAPS/SEC

HOW TO WIN A 24-HOUR WORLD CHAMPIONSHIP RACE

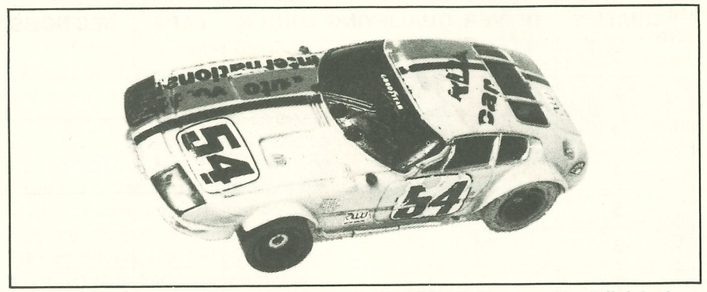
(By JOE LUBINSKI, captain of the Auto World/Polish Race Drivers of America Team that set a new world record of 163.07 miles in 24 hours at "Auto Expo '77", held in April in New York City. Other team drivers were Sammy Ryan, Ron Baker, and Jim Baker).

The first thing to consider when preparing a car for an endurance race is, the type of car itself. I chose the Aurora G-Plus type car. This is the most reliable, fastest, and easiest handling car on the market, and it also has quick parts changeability.

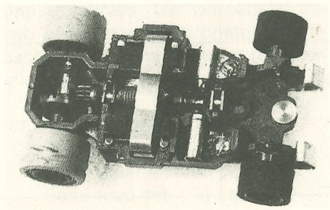
For the body I picked the Ferrari Daytona coupe. This body has minimal overhang in the rear, is aerodynamically clean, and is less likely to get knocked off the track by another car during the race. Also, cars with long rear overhangs can easily get hung up on guard rails when racing.

Once the body has been chosen, the next step in its preparation is to lighten it. In hard plastic body cars, like in the Aurora I chose, there is much plastic on the inside that can be shaved away. With a cutting tool cut away as much unneeded plastic as possible. No matter how small the weight of the body is reduced, this will decrease the amount the motor has to pull around the track, and the car will go just that much faster. Every little bit counts.

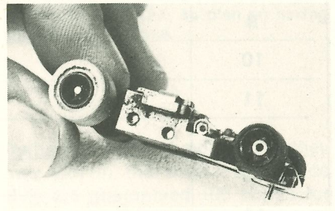
Once the body has been lightened, you can prepare the chassis by stripping it down part by part. Holes were then drilled in the chassis at the points indicated in diagram 1. We used 1/16th and 1/8th inch drills.



The World's fastest! Here's the Auto World/PRDA G-Plus car after it finished its record-setting race.



Top view of chassis of record-holding car.



Holes were drilled in the side of the chassis to reduce weight, increase speed.

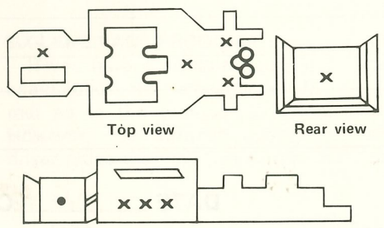


DIAGRAM 1. "X" indicates points in chassis where holes were drilled.

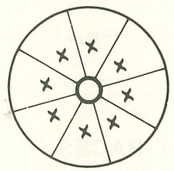


DIAGRAM 2. Holes can even be drilled between spokes of wheels.

While it may not have been necessary, we drilled the wheels out between the spokes with a 1/64th inch drill (See diagram 2). The effect of this was actually more on our competition than on our car; they really got psyched out when they saw we would go this far.

The rear wheels and tires are of utmost importance. I used Black Auto World Powerslicks and glued them to the rims with GE SILICONE SEAL (the only glue that works on these silicone-based tires). You should let the tires dry for at least 24 hours, and it is wise to make up several sets.

For the front tires we used the stock G-Plus tires. They seemed to work the best.

Next, epoxy the pinion gear to the armature shaft. This is so the gear won't work loose during the race. This too should dry for 24 hours before using.

Now reassemble the car and lubricate the gears, the axles where they go through the plastic frame, and the front and rear armature bushings. I used Auto World Grand Prix oil, because it won't dry out or gum up. Don't use too much oil and make sure to oil the armature bushings, especially the rear as this takes most of the stress during the race.

It is now time to test and retest the car, making sure that all parts are properly fitted and "run in". A new car is a little stiff, and it takes an hour or so of running before it really loosens up and "works good".

When the car itself is ready, plan your race strategy. Since we didn't want to get caught in the middle of the track with a car that has a part failure, our team after many hours of testing developed this pit stop schedule:

1. Every 90 minutes, lubricate the car and change pick-up shoes.
2. Every 6 hours, change the steel guide pin (it does wear out).
3. Every lap, drive carefully.

During the whole 24 hour race we made no other part changes on our car. We did not have to change brushes, armatures, magnets, or tires.

(The 24 Hour Race runs were made on the Clubman AFX Layout design. A four-lane track that fits on two 4' x 8' plywood tables. This permits uniformity in the number of turns, length of straightaways, etc. This layout is fully described and explained elsewhere in this book.

Doing something spectacular is not easy. It's a lot of work, but it's also very rewarding. Especially if you can set a new record. Practicing for days and nights is important, as well as practice in changing parts that could come off or wear out.

Running 24 hours with a G-Plus car requires a lot of concentration and fast reflexes. The cars are very, very quick and you need good eyes, steady nerves and lots of stamina. The key is to stay on the track or you'll spend most of your time waiting for the corner marshall to put your car back on the track.

Lost time means lost laps, and when the final score is tallied up, it's the laps that count.

The winning team drove 17,907 laps on the Clubman track to set an actual distance of 163.07 miles traveled. That's a lot of miles for a G-Plus car in 24 hours at full speed. In fact, that's a lot of dependable racing for a tiny car.

HERE ARE THE RULES IF YOU WANT TO CHALLENGE THE RECORD

CARS

Modified Aurora AFX G-Plus cars of any stock body style available. Any part worn or broken may be replaced during the race but whole cars or whole assemblies may not be changed. Part by part must be changed.

The winning team, left to right: Ron Baker, Joe Lubinski, Sammy Ryan, and Jim Baker.

TRACK

Aurora AFX plastic track was used. The track joints may be soldered. Track was color coded for ease of marshalling.

TRACK DESIGN

The Aurora CLUBMAN design layout was used as described in this handbook to standardize the circuit. This means that everyone would be racing on the same course with the same design so lap times would be equal. The track was leveled with a carpenters level, so the course would be perfectly flat.

POWER

Each lane to be powered by one AFX DC-2 (Heavy Duty) powerpack # 1444 (4 powerpacks total).

CONTROLLERS

Any controller may be used. Drivers can use their own. A quick change plug can be used for rapid replacement.

LAP COUNTERS

An Aurora AFX LED Lap Counter or similar can be used. Lap counter must be triggered by car passing contact or photolight. All four lanes must be counted.

TIMING OVERALL

The start of the race and end of the race must be timed by an accurate watch. An electronic wristwatch will do.

RACE PROGRAM

1. Lanes for the start of the race are chosen at random.

2. All four lanes are used by each team for 6 hours.

3. A one minute stop is allowed to change lanes and record laps for each car run. Cars are moved to the next lane clockwise.

4. Four marshalls, made up of the four resting drivers are used.

5. A minimum of two teams with a maximum of four drivers on each team is allowed.

6. Each driver runs a minimum of one hour before a driver change.

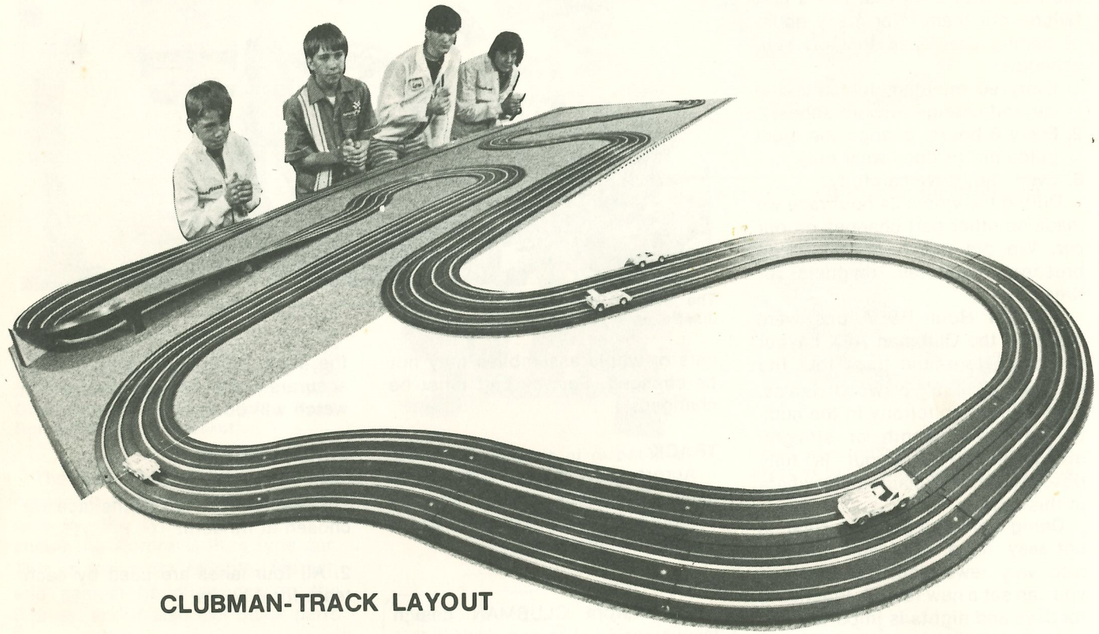
RESULTS

A suitable number of witnesses (10 or more) must file a report, listing laps run, date, time, race director, drivers, in order for the record to be official. Notification of the event prior to it taking place is also required.

Send report to:

AURORA AFX DEPARTMENT
AURORA-MARX
633 Hope Street
Stamford, Conn. 06907

THE CLUBMAN TRACK FOR INTERCLUB AFX RACING BY MAIL



CLUBMAN-TRACK LAYOUT

BY USING THIS UNIVERSAL LAYOUT
YOU CAN RACE CLUBS ANYWHERE — BY MAIL!
IT'S TIME = LAPS + SECTIONS.

Once you have a Clubman layout and have established a club, age groups, and classes for racing, you might want to write to some of the major magazines and see if they can locate other clubs who are set up to race by mail.

The accompanying drawings and track-section list are all you need to get started. Make sure you color-code the lanes and number the track sections as explained elsewhere in this manual. All track is AFX High-performance type. The power supply consists of two No. 1444 Aurora AFX—DC-2 High-performance powerpacks. Any controllers may be used, since different classes may require controllers of different ohm ratings. The track MUST be leveled, using a good carpenters' level, since an unlevel track will greatly affect lap times and race results (from going uphill and downhill). No tire goop or traction fluid should ever be used on the track, and the track should be cleaned before each race.

This Clubman program will greatly increase your enjoyment of AFX racing, since you'll be able to compare your skill with that of many, many other racers and see how you're doin'!

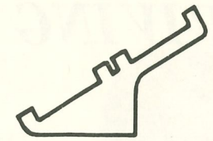
Can you beat the Wisconsin hotshots? How about the drivers in New York, or Los Angeles? You may never get a chance to race with these drivers in person, but the "Clubman Track Racing Program" can help you do the next best thing—Race by mail!

The Clubman AFX track layout was designed to cover two four-by-eight-foot platforms in an eight-by-twelve foot area and provide the most challenging four-lane course possible. At the same time, this layout provides adequate marshalling areas and driver visibility so the competitions will be fair and exciting. This track is a good club racing size and will fit nicely into a recreation room.

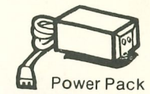
The use of identical tracks is the basis for racing-by-mail. Because it's a standardized, fixed design with powerpacks as shown, any club can duplicate the Clubman layout. The 'name of the game', here, is to see who can cover the longest distance in laps plus sections of track in a given time with a given car. Two, ten or even fifty clubs across the U.S.A., in Canada, and even other countries can then exchange information on the classes they're running, the number of minutes of actual racing, and the distance the drivers have covered in their respective classes. Get the idea?

AURORA®
MODEL MOTORING®
CLUB LAYOUT

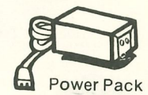
2—DC2 Power Packs
8—Terminal Screws
2—Clip-on Terminals
4—Bank Curve Supports
4—Connecting Wire
1—Layout Sheet
1—Combination Wrench
1—Model Motoring Manual
20—Spring Clips



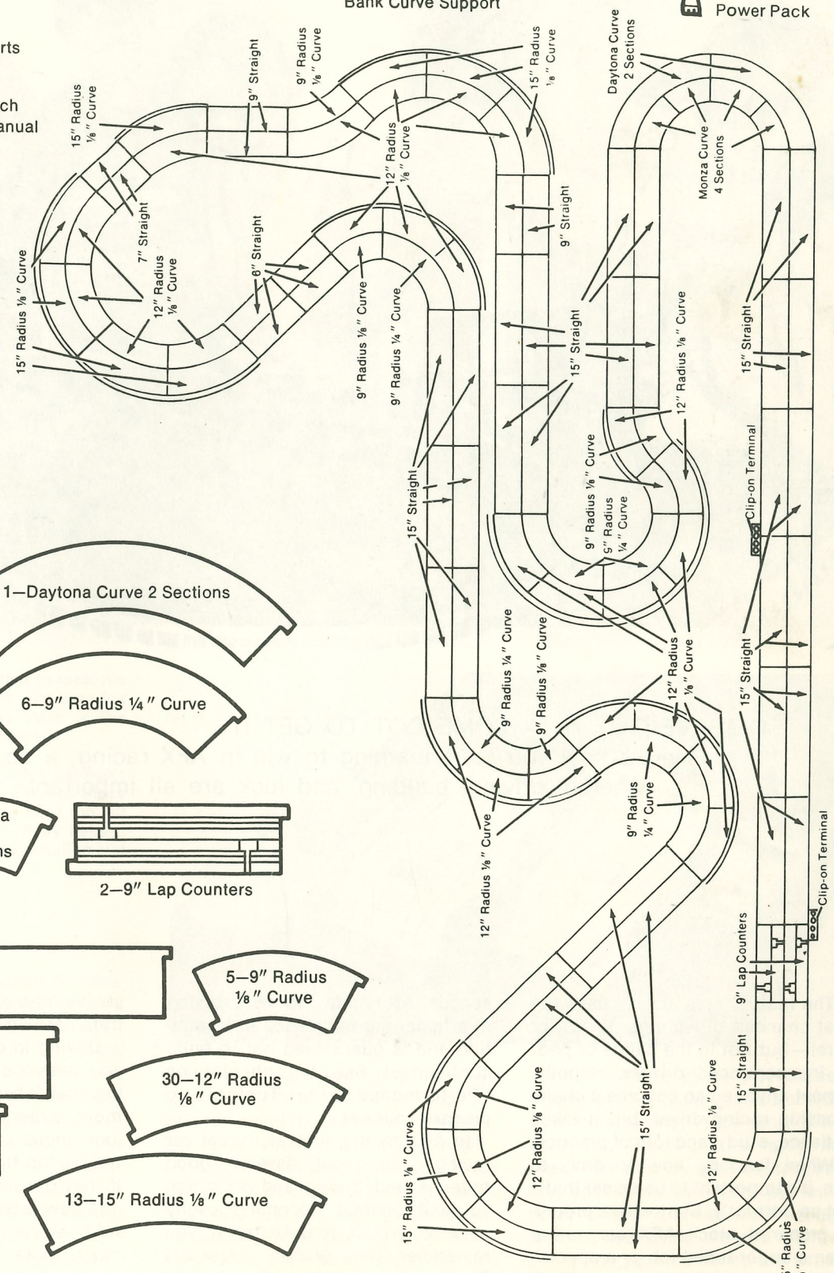
Bank Curve Support



Power Pack



Power Pack



1—Daytona Curve 2 Sections

6—9" Radius ¼" Curve

1—Monza Curve 4 Sections

2—9" Lap Counters

34—15" Straight

4—9" Straight

2—7" Straight

4—6" Straight

5—9" Radius ⅛" Curve

30—12" Radius ⅛" Curve

13—15" Radius ⅛" Curve

DRIVING TO WIN

SOME 'VE GOT IT — SOME GOT TO GET IT

Here's how you start learning to win in AFX racing, a sport wherein driving, building, and luck are all important:

The fastest cars always have the best chances of winning, that's for sure!—but not in the hands of poor or inexperienced drivers. Happily, almost anyone can become a championship racing driver, but it takes patience, study, and lots of practice.

When learning how to drive to win, it's important to use a car that's set up correctly. Start with a properly prepared stock AFX car, rather than a super-tuned job or a special, so you can acquire the proper 'feel' and rhythm while driving at low speeds. Attempting to start driving in a faster car only leads to frustration and is guaranteed not to build confidence! See the chapter on "Performance Fine Tuning" to prepare your car.

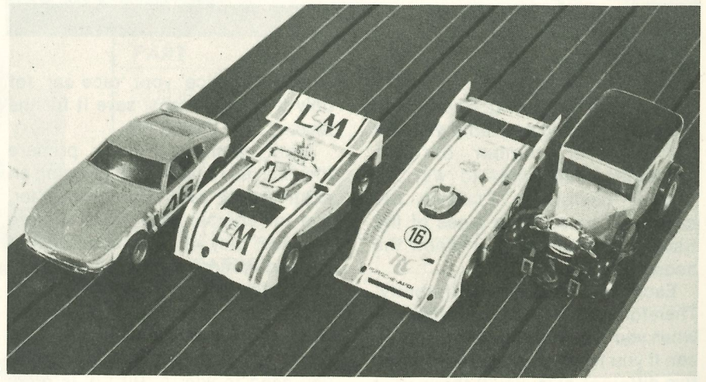
In AFX racing, just as in real car racing, you must develop good reflexes and timing and condition yourself against becoming overly nervous. You'll fare better if you remember two golden rules: (1) Don't worry about the other drivers; let them worry about you. (2) After you've learned what to do, concentrate hard on doing it.

Driving in competition may make you nervous at first. This isn't unusual. It happens to everyone. The more experienced drivers usually look more casual but, very often, they're 'up tight' inside, particularly if they're running high up in points and have several close challengers. As a newcomer to racing, you'll have much more fun as you work your way up the ladder; when you become a 'pro', it becomes hard and

1

1. When drivers get together to race, it's a challenge of nerves, skill, and knowing the course. Here, at the start, is the driver's most anxious moment!

2. While learning to win, don't 'car-hop'! Use only one type of car. Each of these cars will handle differenty, even tho' all are stock AFX machines. Body height, width, and length influence handling and air drag.



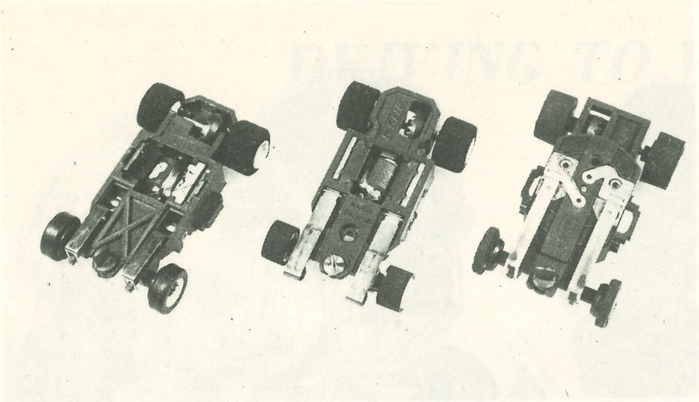
2

serious work.

Before you go anywhere to race, you must practice at home or on a track that's open for practice, not in a timed race. Since you'll be racing on different tracks, your first lesson will consist of finding out the best way to 'learn' each race track. Every track has a 'rhythm' based on the power-on and power-off points. While cars may differ, the rhythm is always similar for each driver during a lap.

Pick the longest lane (lane lengths vary on almost every layout—see chapter on "Racing Rules") and start practicing, running slowly at first while trying to develop a feel for the track's rhythm. It's like music: On-off, on-off-eeeezzzzz, then ON! Put everything else out of your mind: Concentrate! Hear and feel the rhythm, listen to the sound of the car. If you've ever heard the sounds of Can Am or Grand Prix cars on a road course, you'll know what we mean.

Do five laps in a row, concentrating on the braking and acceleration points, then stop and check your car. Do ten laps, stop and check the car. Do twenty laps, stop and check the car. Work up to the point where you can do fifty laps without deslotting. As you improve, you'll find your lap times are almost the same and you've developed a rhythm for the track. That's when



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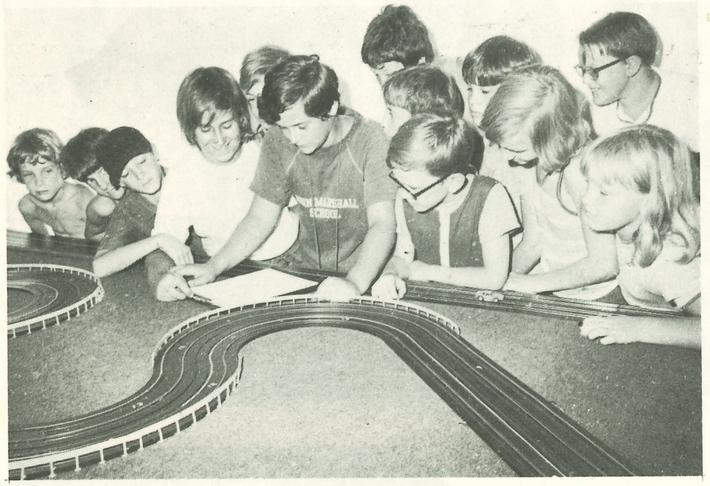
3. Three different chassis (left to right) the AFX Super Magna Traction, the G-Plus and the AFX Magna Traction car. All with magna traction, they are the easiest cars to drive.

4.Reading and understanding the rules thoroughly will help avoid errors; it will also give you ideas on using the rules to your own advantage.



4

you can try to do five VERY HOT laps without deslotting. Repeat this program over and over until you can do whatever number of laps is needed—full bore—to win ... without deslotting. Practice the same way on ALL the lanes of the track. Only then will you "know the course".

Each car handles differently. Therefore, to develop consistency when you're practicing, use only one car. If you try to practice with four or five different cars, you'll throw your timing off. Don't be a 'car-hopper' when practicing for a race.

Select your fastest car for the actual race and check it out. Make sure you have a second car, either identical or similar enough so it feels the same as the first on any track. Use the second car for practice, since practice may be harder on a car than the actual race and you don't want to risk losing your best car in an accident. 'Practice' your 'race car' for only five or ten laps; save it for the race.

Most winning drivers prepare themselves for a race by bringing an extra car or two, spare controller, and (of course) their tools. Before the race, they will have checked out their equipment thoroughly and kept it in order...Each item in the same place, always! You never know when you'll need something quickly—and a precious second or two may be all you need to win. A 'Pit Kit' is great for this.

Here are some pointers for your first race. Make a check list just like the full-size auto race teams do, and use it. A sample list is shown. When you arrive at the raceway, get down to concentrating on what you have to do while visiting with the other drivers. You can size up their equipment, talk over new innovations, and—in general—have fun and learn what's going on. But always remember, don't let them worry you!

Make sure you understand the rules and the way you're to qualify. If not, ask questions. Rules vary from Coast to Coast. Before you even put your car on the track, stand beside someone who's practicing and 'practice' with him. Follow his car with your eyes while secretly working your controller thumb, lap after lap, to pick up the rhythm. When you think you've got it, sign up for practice.

When you get on the track, practice your 'worst corner' first to learn it and overcome your fear of it. Remember that you can lose a lot of ground if you deslot in one of the slow corners, so treat them with respect. The places you'll pick up the most speed and distance are exiting from corners that have long straights following them. You want to go down these straightaways as fast as you can, so a good exit from the preceding corners is essential. Another tip: Fast corners are the place to pick up extra distance. If you can hang in there on the faster bends and corners, you'll be ahead of the pack.

Now comes the time when you put it all together, the actual race! Remember, if you've prepared your car properly and practiced conscientiously, you have just as much chance of winning as any of the other drivers. Concentrate on your own car and that track rhythm you've learned: Never mind what the other drivers are doing! That hotshot who's in the lead may deslot in the next corner. Maintain your best speed, and don't let the competition tempt you into overdriving your car and 'blowing it!'. If you need to stop for repairs, keep calm! Work quickly without lost motion, and you'll be back in the race sooner than you thought possible.

Above all, remember that while winning is important, it's not the only satisfying reward in racing. Being able to play the game and play it well is a rewarding experience in itself. The people you'll meet, the experiences you'll encounter, the fun and excitement of 'auto racing', all add to the satisfaction you'll find in this hobby sport.

When you lose, determine why you lost. Identify what you did wrong and try to correct it. It could be your timing, it could be your car, it could be your inability to concentrate, or maybe you were just 'unlucky' and someone knocked you off the track when they deslotted. As in real racing, there's always a next time and, as the racers say, "At the next race, the clock goes back to zero".

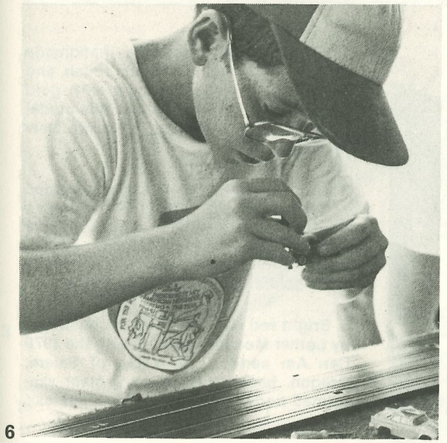
5

5. Everybody is a little nervous before the big race, but the cooler you stay, the better you'll do. Keep an eye on the other drivers; practice driving with your thumb even tho' your car isn't on the track yet.

6. Drive hard consistently and without deslotting for five laps. Stop and check your car. Next time out, drive hard and consistently for ten laps. Again, stop and check your car. Keep at it 'til you can do a hundred laps.

7. Winning is important but it's not the only reward in racing. The people you meet and race with, the experiences you encounter, all add to the satisfactions you'll find in this hobby sport.

8. Prepare your car thoroughly before every race. Here's a racing car inspection form you may copy and use while checking out your cars. This is really a scaled-down version of the race-car checklist used by the Auto World racing team.



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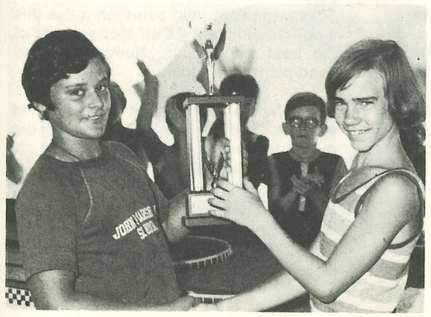


7

AFX RACE CAR INSPECTION FORM

DATE _____

CAR _____

EVENT _____

QUALIFYING POSITION _____ **BEST FINISH** _____

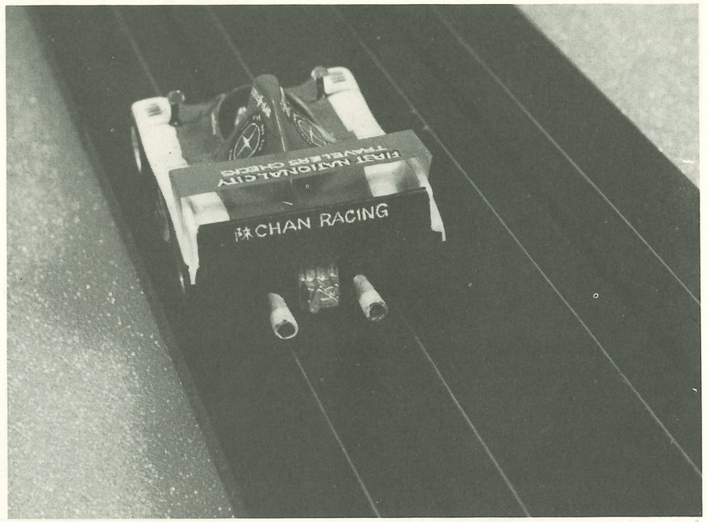
PART	*OK*	*REPLACE*	*COMMENTS*
GUIDE SHOE			
PICKUPS			
PICKUP SPRINGS			
MOTOR BRUSHES			
ARMATURE			
COMUTATOR			
GEARS			
AXLES			
REAR WHEELS-TIRES			
FRONT WHEELS-TIRES			
GEAR CLIP			
BODY MOUNT			
BODY			
OIL			
TRACK CLEARANCE			
TIRE STICK			

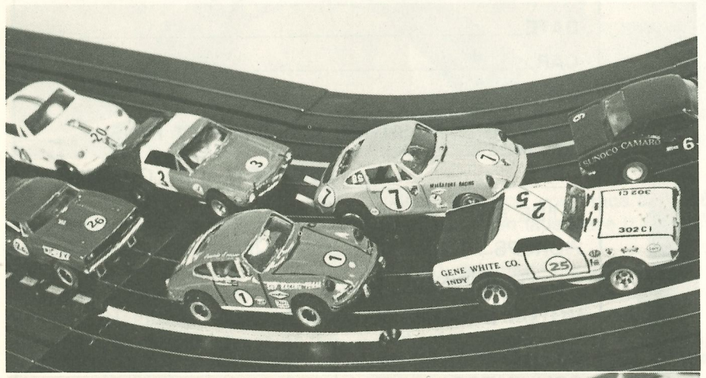
8

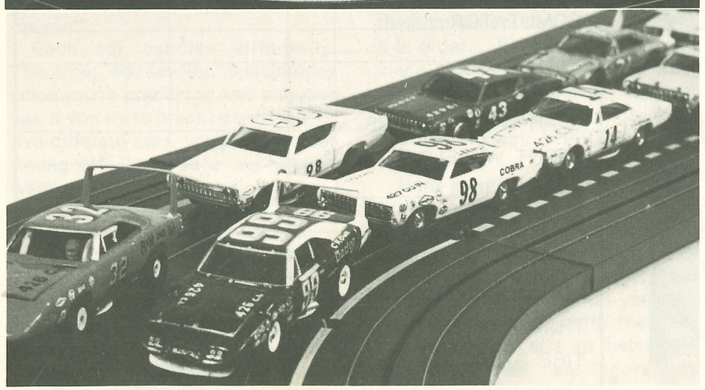
RACING NUMBERS AND LETTERS

The rules established by the various race sanctioning bodies require that the car's number be shown clearly on both sides, the front, and rear. NASCAR, because of the high-banked ovals used in stock-car racing, requires that numbers be placed on the tops of the cars as well. To make your AFX racing even more realistic, be sure to number and letter your cars 'just like the big ones'. A vast assortment of decals is available for this purpose.

Here are photos of a number of entries in the Auto World HO Championships, showing how their owners detailed and decorated their cars. Study them: They're loaded with ideas!







1. Chopped Willys body, handmade bumpers and engine, maroon finish, and hand-painted white numbers with gold outlines are the highlights of this model by Donald Lazeunick of Peekskill, New York.

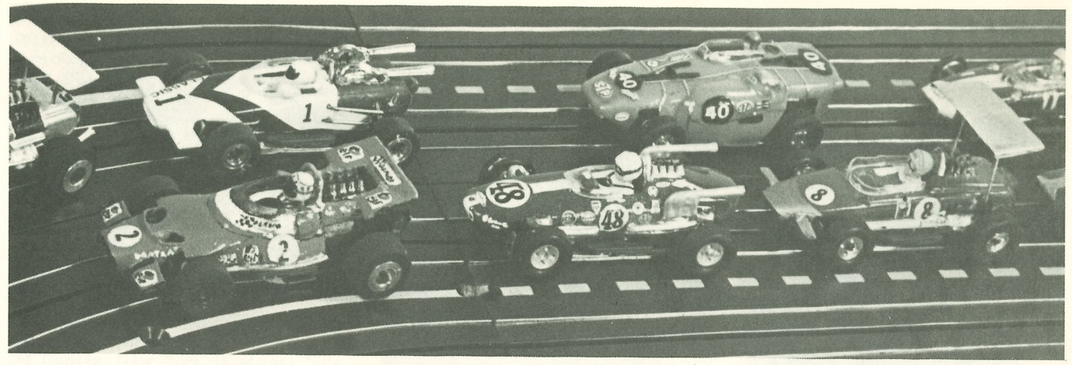
2. This Can Am Lola (vacuum-formed body) features 'spoilers'—front runners on the fenders and a dam over the radiator outlet. Color scheme is red, white, and blue, including the driver's 'star' helmet. Model by Mike Abella.

3. Bright red McLaren copies one driven by Lother Mochanbacker during the 1970 Can Am series. Lyle Yates of Salem, Oregon, based the car on a clear vac-formed body; made the mirrors, roll-bar, and wing by hand.

4. Scratchbuilt exhausts and bumpers, driver inside, and colorful gold/orange/red mist paint job make this modified stocker by Cliff McCann one of the best we've seen. Number 53 was hand-painted on doors.

5. Jim Wilson turned out this modified stocker, adding fat tires and a big overhead wing. This type of car is popular in many areas.

6. Ever-popular Willys wears bumper and exhaust pipes made from brass tubing. Paint-job is blue with white press-on numbers and lettering. Front wheels carry silicone slicks, rear tires are sponge. Built by Kevin Gallagher.



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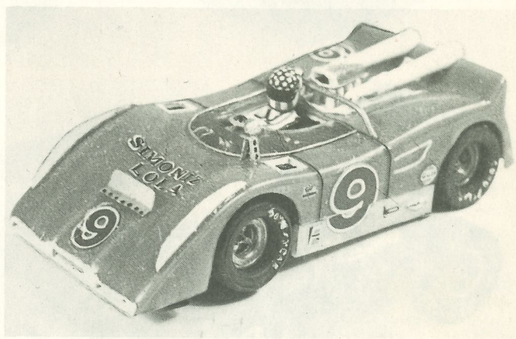

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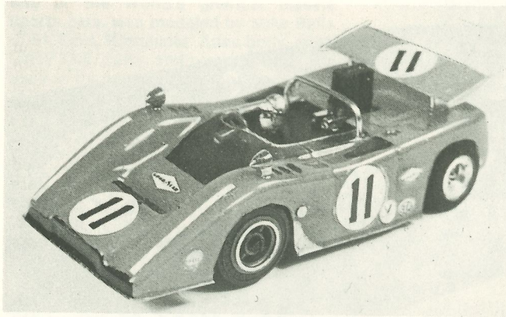

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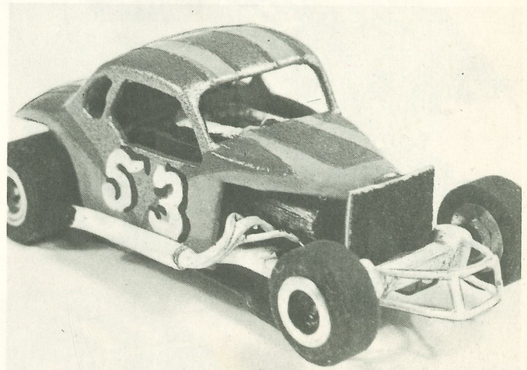

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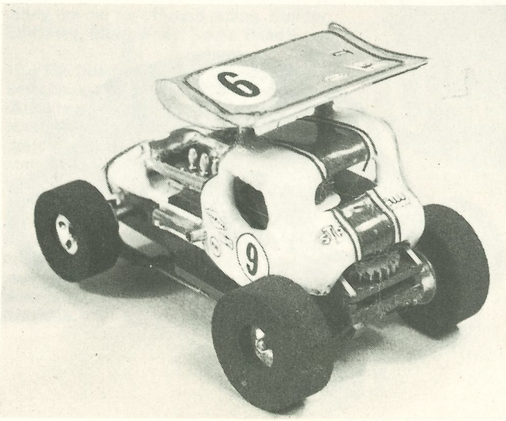

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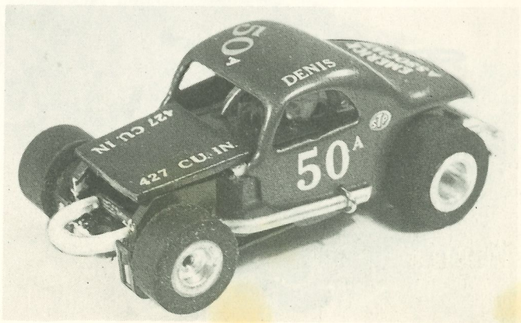

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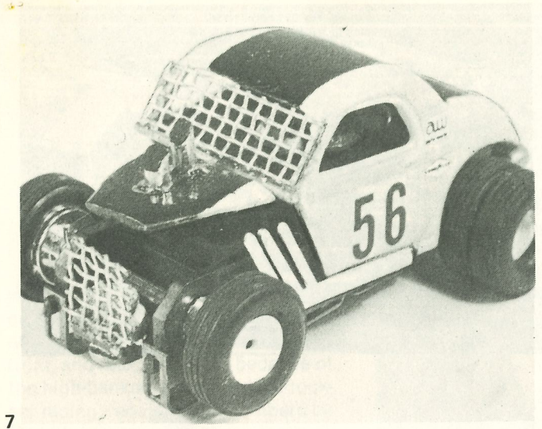

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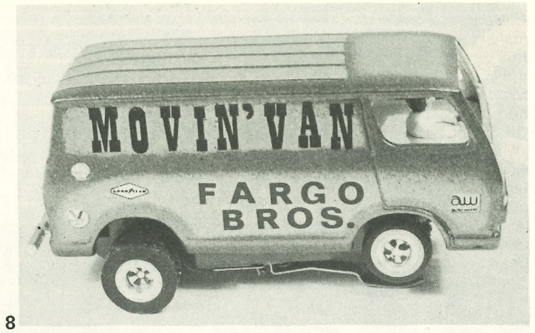

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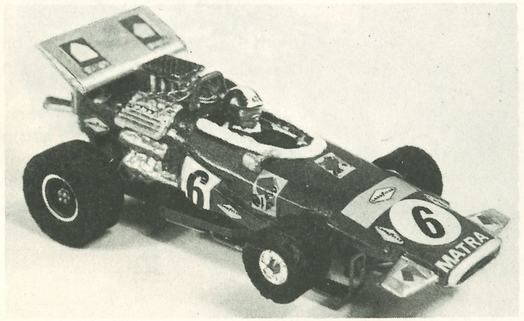

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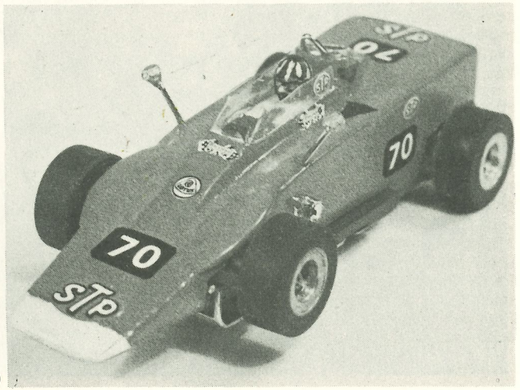

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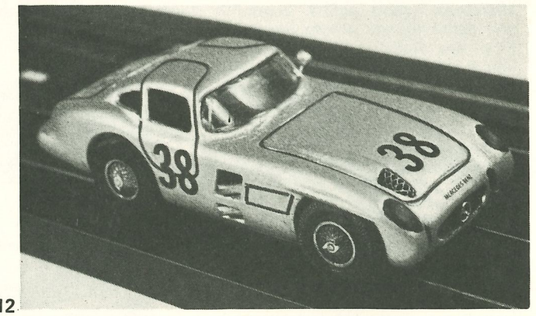

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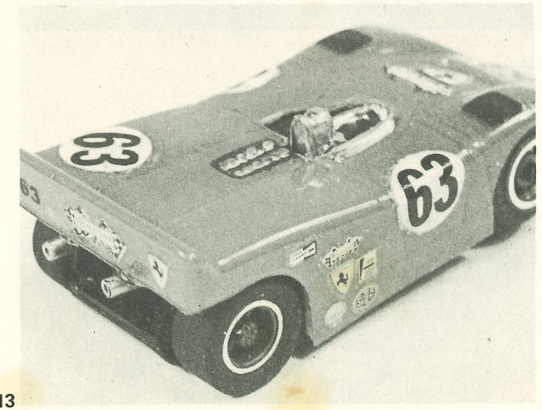

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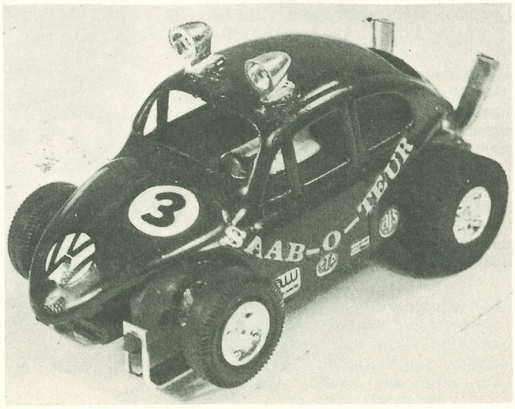

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7. Aluminum window-screen was used to make those formidable stone-guards on this dirt-track stocker. And look at those dual rear tires! This yellow-and-black racer just has to be different, even if it may not be legal. Michael Fink of Jewett City, Connecticut, is the builder.

8. Vans are IN and this early photo (vintage 1970) shows that paint fogging is possible in HO. Highly effective lettering is press-on type. Finish is Satan-blue metalflake, fogged with silver smoke and pearl overlays. Van was built by Cliff and Jim Fargo, Medina, Ohio.

9. Grand Prix machinery is gaining in popularity. This entry, by Fred Bertram of Geneva, New York, is almost fully scratchbuilt. When Fred created this model in 1971, "Elf" decals weren't available and had to be hand painted. Yes, it all fits on an AFX chassis!

10. The STP turbine car in flaming STP fluorescent red, as driven by Graham Hill in the 1968 Indy 500. Body was made from balsa wood, mirrors from pins and balsa. Builder Marty Gibbons even painted Hill's helmot.

11. James Heaps took an Aurora Ferrari Dino, used sheet plastic to create this Ferrari 512/S. Model is replica of car that ran in the 1970 Daytona 24-hour race; has Ferrari red paint-job and is trimmed with Auto World decals.

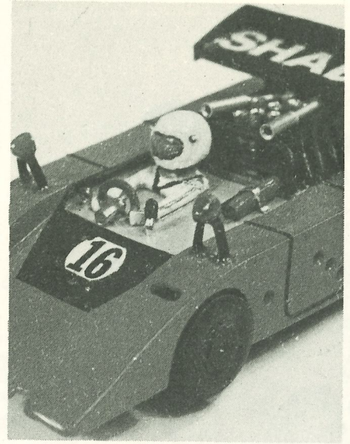
12. Gull-wing Mercedes Benz 300 SLR, one of the World's greatest classic sports cars, was modeled by Mike Sells of St. Paul, Minnesota. Atlas body, Mini-Lindy XKE, putty, and scrap plastic were used in its construction: Total cost was about $5, including AFX chassis. Paint is a beautiful silver.

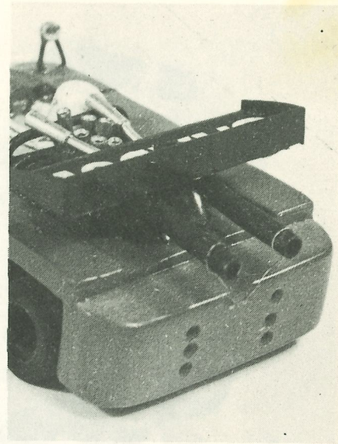
13. Black numbers on white, located on nose, sides, and tail; sponsor decals on the sides. That's the way most of the rules read. Richard Coutant of Herkimer, New York, built this red Ferrari Can Am car.

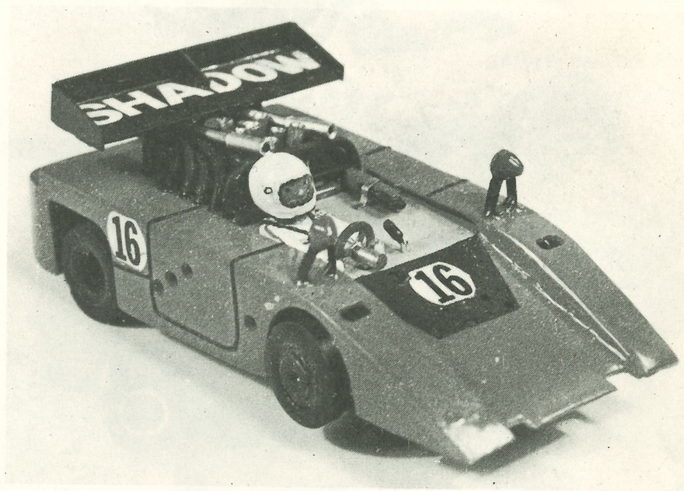
14. This off-the-road VW is called "The SAAB-O-Teur" because, we understand, it's a SAAB car with VW body. The fenders were removed, details added, to ready the car for off-road racing. Builder: Ed Oines, Sioux Falls, South Dakota.

15. "The Shadow Knows", and J. Michael Sells knew what the first Shadow looked like when he tackled this one in AFX scale. Orville Banisek also helped on this project, which features scratchbuilt body and details. Body is red, wing is black.

16. This black-and-white photo doesn't do justice to the beautiful "Silver Fox" paint job on Howard Kilgore's superb Mustang funny car. Two Mustang bodies were cut apart, then rejoined to extend the nose.







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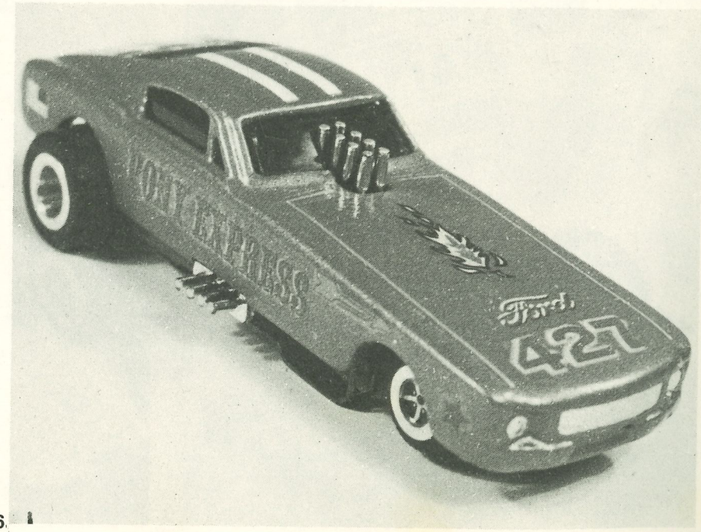

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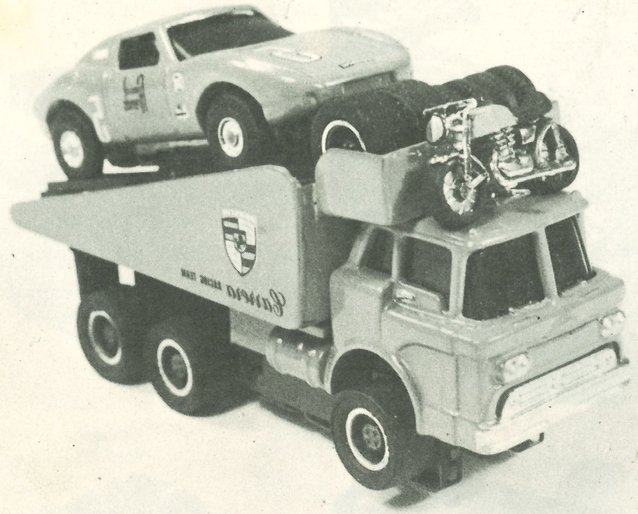

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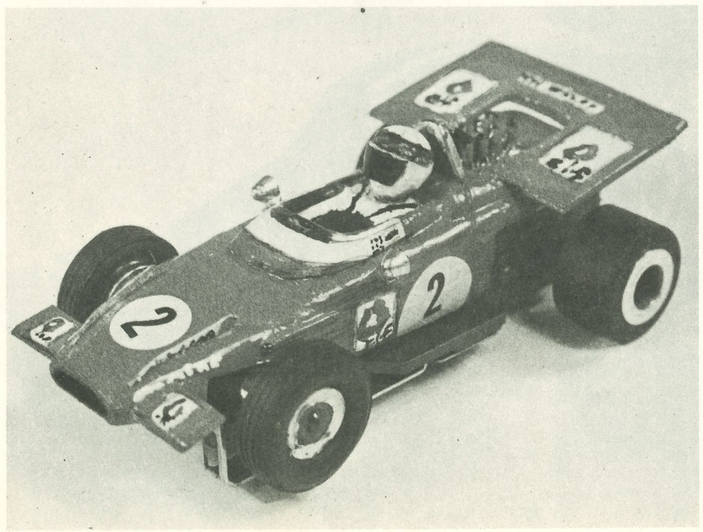

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17. "Piggybacking" is popular among racing teams that have long hauls. This team vehicle was made from an Aurora truck by Howard Kilgore, with body scratched from plastic sheet. The rig is painted competition orange. Cab roof carries Mini-Lindy motorcycle. You'll find many ideas for building cars and trucks at every race course.

18. This blue Formula I Matra was entered in the Auto World contest in February, 1971. It was practically hand-made by Harry Legatt of Great Neck, New York, starting with one of the early Aurora Formula cars. Model is faithful copy of Jackie Stewart's mount, with wings and airfoil made from plastic and cemented in place. The "Elf" insignia is hand-painted.

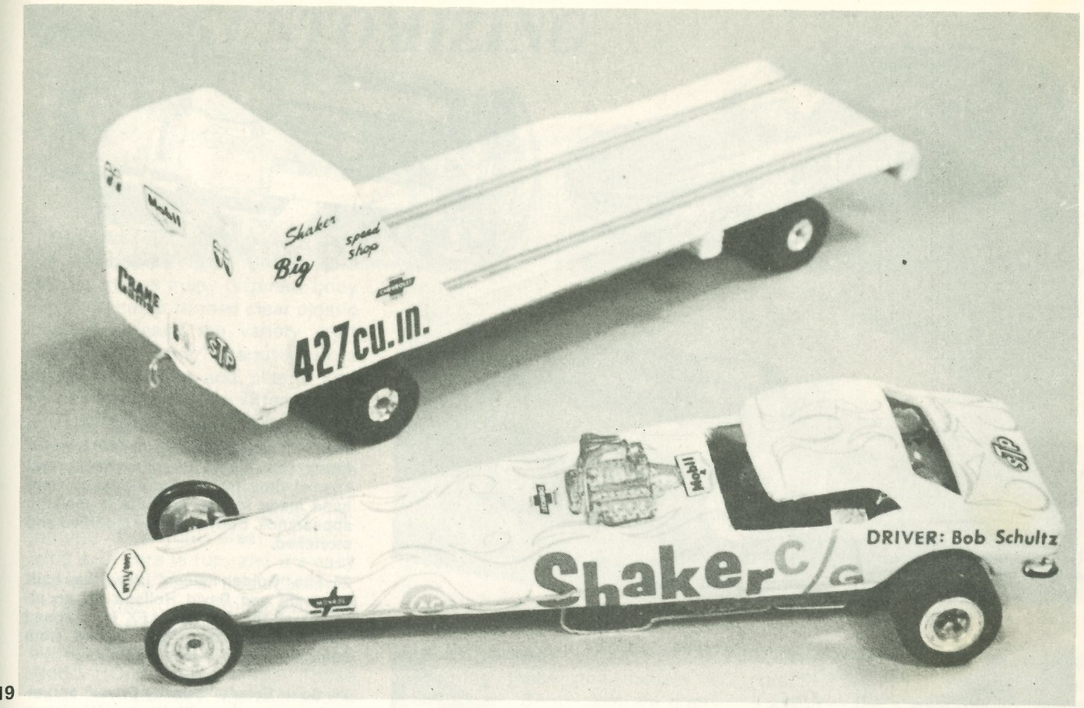
19. This l—o—n—g funny car is by John Borja. Basic body is Camaro, with hand-made wooden extension. Carrier is also scratchbuilt from sheet wood. Both vehicles are painted white, decorated with decals from other model kits.

20. John Isbell of Springfield, Missouri used a formed body, hand-drawn over a carved and shaped wooden block, as the starting point for this NASCAR stocker. It's painted red and uses Auto World decals and hand-painted lettering. Note the "Goodyear" name on the tires!

21. That's Graham Hill in this Gold Leaf Team Lotus! Model is red, white, and gold like the prototype; Orville Banasik modified an early Aurora Formula car and added wings made of scrap wood and plastic.

22. Jim Hall's "Working-wing" Chaparral, almost completely hand-built by Robert E. Barnett back in 1970. Wheels are from a "Matchbox" model for added realism.

23. T. Max Copenheauer built this two-tone green metallic funny car, called "The Dart", by chopping two stock bodies, cementing them together, and puttying the joints. Engines are from "Hot Wheels" models.



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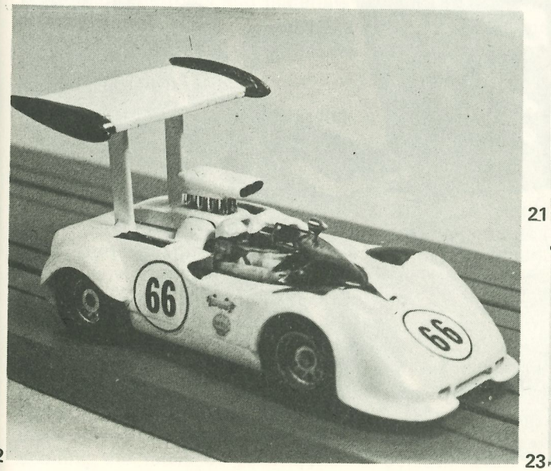

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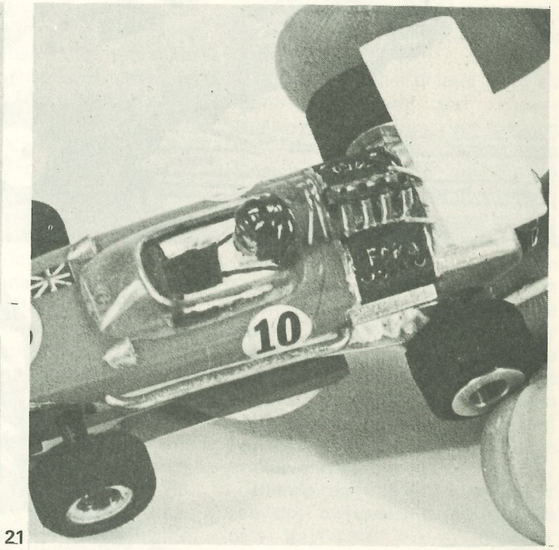

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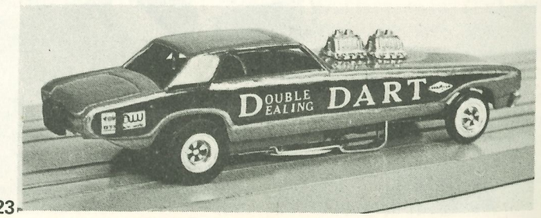

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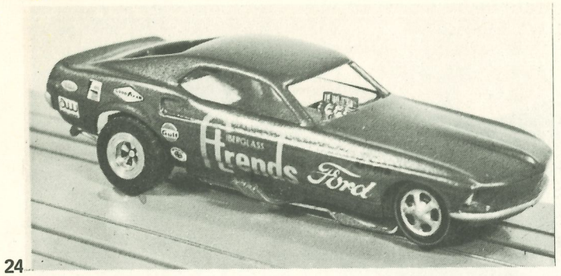

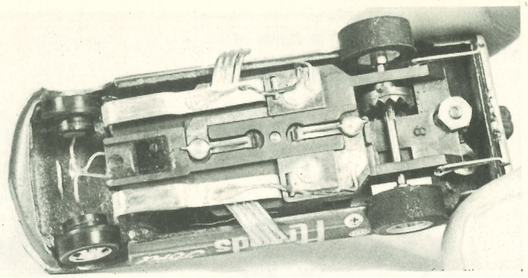

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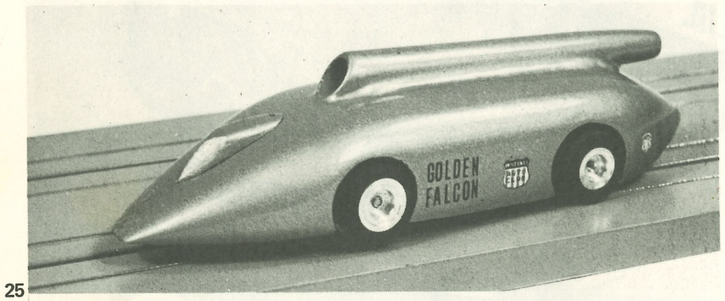

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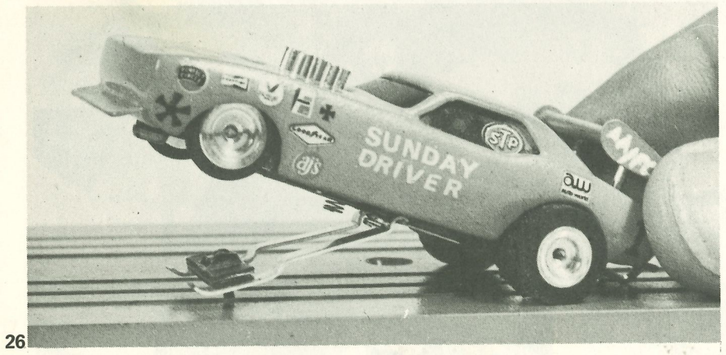

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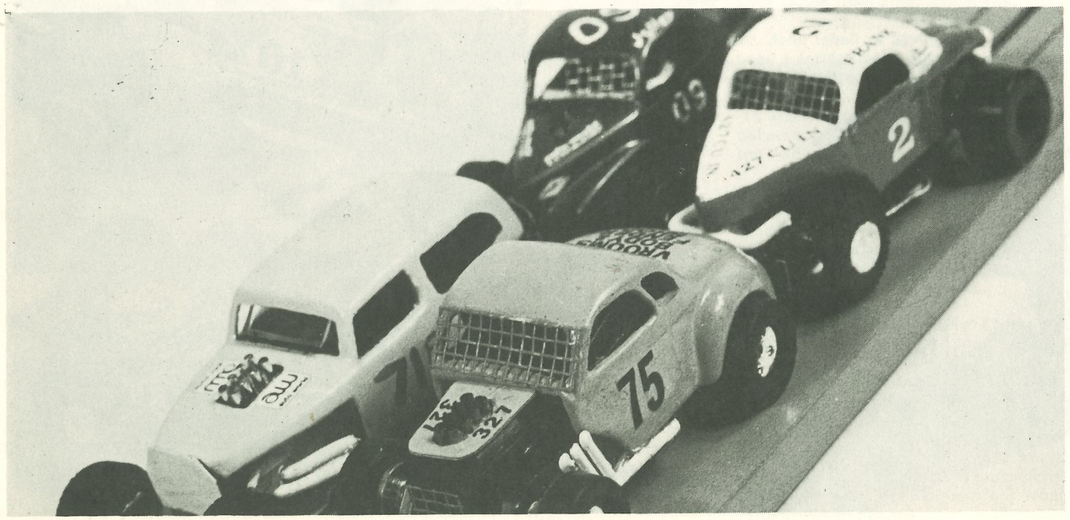
24. Metallic maroon finish sets off Wendell Suyama's fiberglass "Trends" funny car. Pipes, wheelie-wheels, and special rims for the front wheels were hand made for the ultimate in realistic appearance. Body is highly modified and stretched.

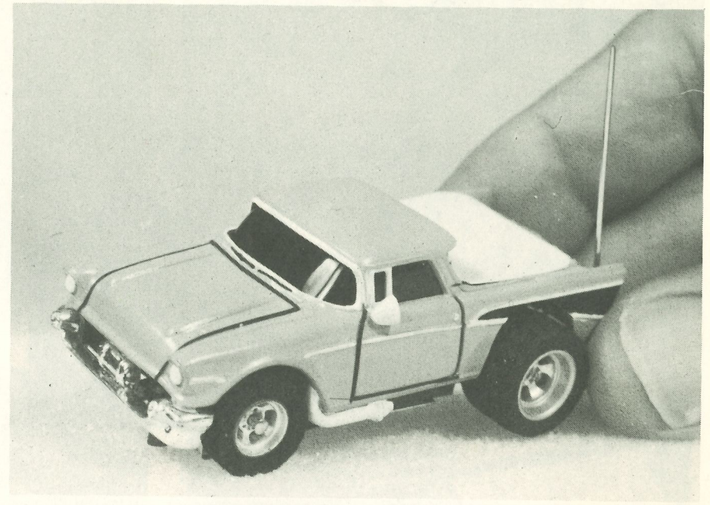
25. The "Golden Falcon" jet car was built by Craig and David Holland for an attempt at the World's AFX land speed record! Model was hand carved from balsa wood and is painted gold.

26. Scott Eyler's "Sunday Driver" actually does wheelies with its special pickup arrangement. Model features a large rear wing, injector stacks made from aluminum tubing, red finish trimmed in white.



AFX CUSTOMIZING

by Rich Morgan and Sammy Ryan



Straight from the box, AFX cars are handsome little brutes and Aurora makes many different body types. Vacuum-formed clear plastic bodies increase the variety even more, and other manufacturers make metal cars and plastic kits whose bodies can be fitted to the AFX chassis. With just a little imagination and ingenuity, however, the AFX enthusiast can create one-of-a-kind customs—models entirely different than those belonging to anyone else! Customizing AFX cars is fun, and it's easy too, as you'll see in this chapter.

The fantastic possibilities of AFX car customizing became evident during the 1970 and 1971 Auto World HO Championships. These "mail-in" contests had numerous classes, and just about every type of car imaginable was entered. Some were built from scratch, but most were made by chopping stock bodies, then adding to them using wood, paper, plastic, and putty.

Deciding what you want to do is just as important as knowing how to do it. Your best bet is to start with one of your older cars and take your ideas from one of the automobile or modeling magazines. Select the car you're going to work on and make a few sketches of how you want to customize it.

Here are the tools and materials you'll need:

1. X-Acto knife
2. Razor saw
3. Assorted fine files
4. Jewelers' loop (or magnifying glass)
5. Plastic or epoxy cement
6. Plastic body putty
7. Fine, medium-fine and medium sandpaper

To start you on your way, the accompanying photos show how you can customize almost any car.

If putty is necessary, rough up the area to be puttied with a file—this will help the putty to stick better. Always build up putty in thin layers, letting it harden between coats. This prevents shrinkage from spoiling the looks of your model after it's painted.

Painting these tiny models is really an art. Spray-cans are pretty big for the job, so use an airbrush if you have one. Otherwise, be careful to spray only a little at a time to avoid runs. Those fancy metallics and candy finishes look great on customs, and are available in numerous colors.

You may not care for some of the designs shown in the photos, but we did them as an exercise to give you some ideas of the possibilities.

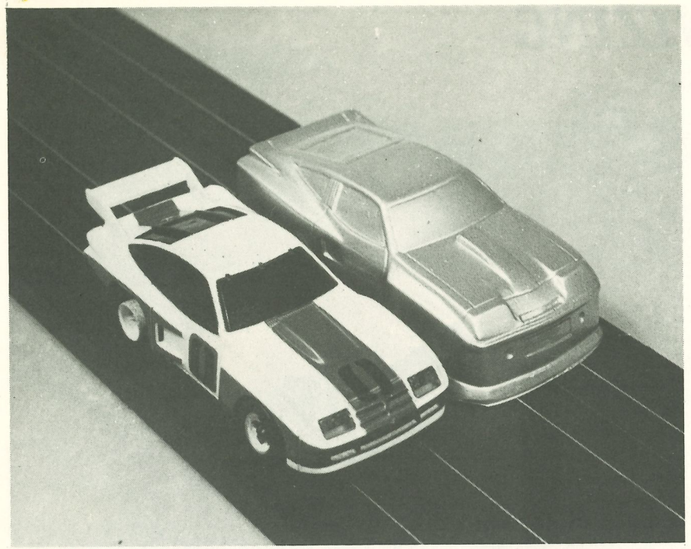
One of our favorites, yet an easy custom job to do, is the '57 Chevy pickup. This sharp little machine was made by cutting away the back section of roof and fitting a tonneau cover shaped from index card to the back. The photos show how this was done.

Wheels and tires are probably the most popular custom equipment available today. You can completely change a car's appearance by installing different wheels and tires. The bigger and wider they are, the better the street rodders like them. Don't be afraid to show them! They're also fun to race, as you'll get more flips and spills. Open up the wheel-wells to suit, using a half-round jewelers' file. Make a pattern first, and work carefully. Otherwise, you'll wind up eyeballing first one side and then the other, changing them until you don't have any material left!

The "Trick tires" are those from the '31 Ford, '55 Chevy and similar cars from the special series. When you add these "super fats" you may have to balance up the front by adding regular rear AFX tires to the front hubs.

Addition of other details, such as mirrors, roll bars, and exhaust pipes will help give your custom that 'finished' look. Make whip antennas from fine wire. Auto World's flex tape comes in 1/64-inch width and is great for marking out doors, windows, hoods, and trunk panels. Roll bars may be made from paper clips, exhaust pipes from small-diameter brass or aluminum tubing. Racing mirrors are easily shaped from scrap plastic. Drivers may be HO people or shaped scraps of wood or plastic. Add your own lettering with Auto World's Instant Letters or the similar press-on type available at art stores.

There's really no end to what you can do, customizing these little cars. If you run out of ideas for reworking the regular AFX bodies, drop in at your favorite toy shop and look for small models that are adaptable to the AFX chassis. The 'Mini-Lindy' models by Lindberg are a popular series and just about the right size. With a brand-new supply of bodies to work with, you can let your imagination run mild or wild. Try it, and see for yourself: Mini-customizing is GREAT!



CLEAR BODIES MADE EASY

by Tom Bowman (Midwest HO Championship Racer) and Rich Morgan (1967 National Custom Model Champion)

You can improve your AFX car's handling and acceleration in a very easy way: Just install a clear plastic body! These super-light body shells automatically lower the center of gravity and lighten the car without disturbing the chassis balance. For out-and-out racing, clear bodies are the choice of modelers although their detail is not as precise as that of the factory bodies.

Clear bodies are made of butyrate or Lexan, the latter being a super-tough plastic developed by General Electric. Lexan's durability makes it the most popular altho' butyrate bodies are also used widely. In either case, a sheet of the clean material is heated to a pliable state, then pulled over a mold using a vacuum pump. When cooled, it remains the shape of the mold.

Many different styles of clear bodies are available and may usually be found at your Aurora Service Station or local hobby shop. Some come with body-mounting devices.

Most bodies are sold untrimmed, so you'll need a modelers' knife or small pair of manicure scissors to trim out the wheel wells and other openings. Once the shell is trimmed, it must be prepared for painting. First, wash it thoroughly with soap and water, rinse, and dry. Follow this with wet sanding, using 600-grit wet-or-dry paper on the body interior so the paint will stick. Don't sand the windshield or other windows, however, as this will give them a 'frosted' appearance not at all conducive to driver visibility!

Decals may be placed inside or outside the body. If you elect to place them inside, be sure they're firm and dry before painting or the paint will run under the edges. A small drop of Walther's Decal Solvaset will settle the decals in place permanently, but it's not really necessary.

While we're on the subject of decals, study the photos in the motor racing magazines and newspapers on auto racing to make sure you have the numbers and other decorations in the proper places. Develop a good library of reference pictures for future modeling. Auto World has a fine selection of miniature decals and you can find others in various kits.

All kinds of 'trick' finishes are available, including metalflakes, glow-at-night paints, and fluorescent paints that light up under black-light bulbs. Beware of some spray and brushing lacquers, however, as they contain solvent so strong it will cause the body material to curl. If you're not sure of any material, test-paint some scrap body plastic first.

Most modelers use brush-on paint since painting the inside of the body will give you a smooth, glossy finish no matter how unevenly the paint is applied. You can use

1. Vacuum-formed clear bodies are feather-light and colorless. They're available in dozens of body styles and usually include a driver figure. Toughest ones are made of Lexan.

2. Trim the body with a knife or manicure scissors. A small file, or sandpaper cemented around a pencil, will help you 'round out' the wheel wells.

3. Wash the body in soapy water to remove any traces of mold-release agents used by some manufacturers. Many modelers 'wet sand' the inside of the body with 600-grit wet-or-dry sandpaper to help the paint stick better.

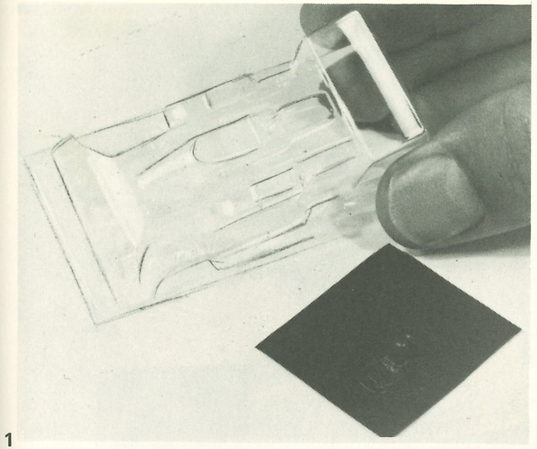
Use any enamel, vacuum-formed body paint, or the new water-based Poly-S paints, to apply chosen color to inside of body with a soft brush. BEWARE of lacquer-base materials, as they may warp and twist the body. Do not paint the windows.

4. Details may be added to body inside before applying main color. but most modelers prefer to detail the outside, using a fine brush.

5. Auto World flex tape is available in 1/64 and 1/32 inch widths. The black color is good for outlining doors and windows on light-colored cars.

6. Dark-colored cars may be detailed with white tape; it's flexible and goes around corners. Other widths and colors are stocked for racing stripes, trim, multi-color designs.

7. Press on lettering, tiny decals and a fine point brush were used to detail this Can Am Lola by Chris Chan. You'll have to hunt the art supply stores or hobby shop to find what you want.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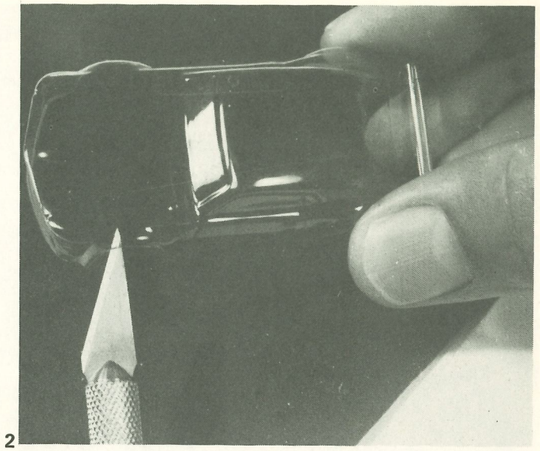
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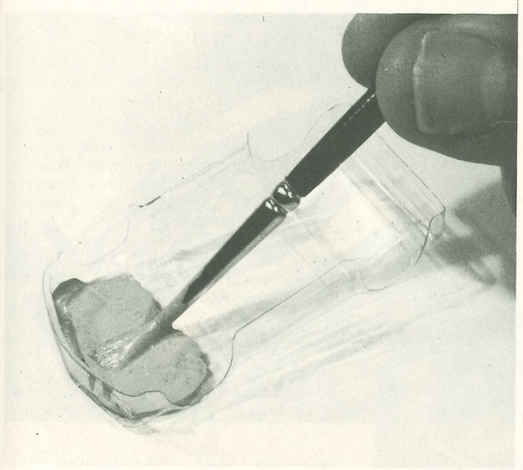
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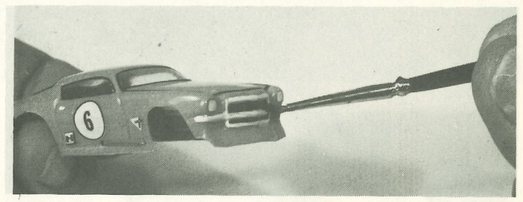
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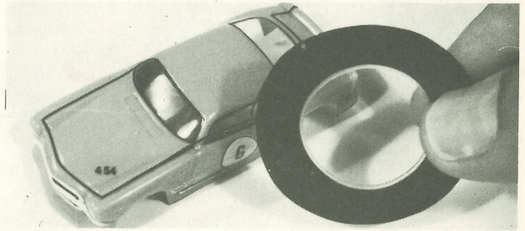
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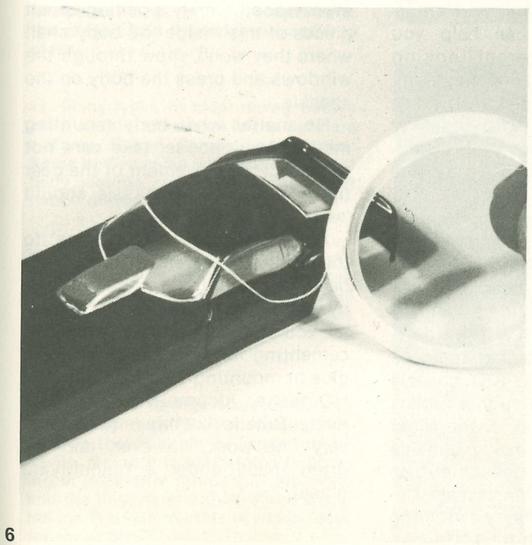
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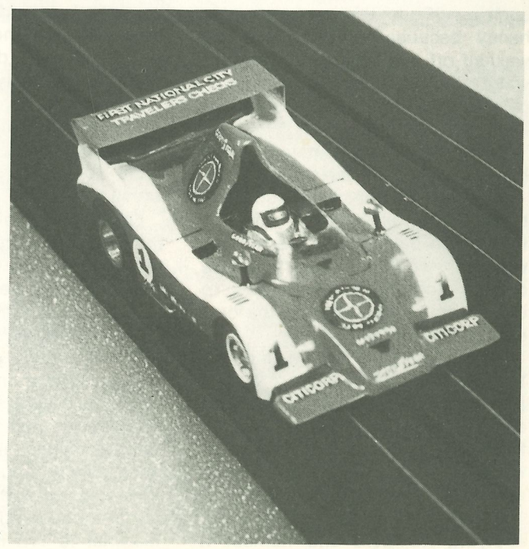

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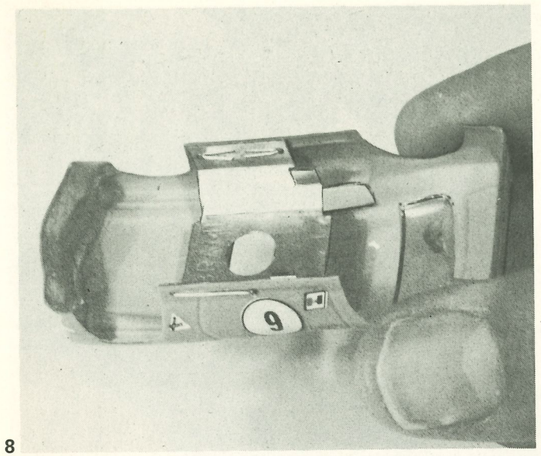

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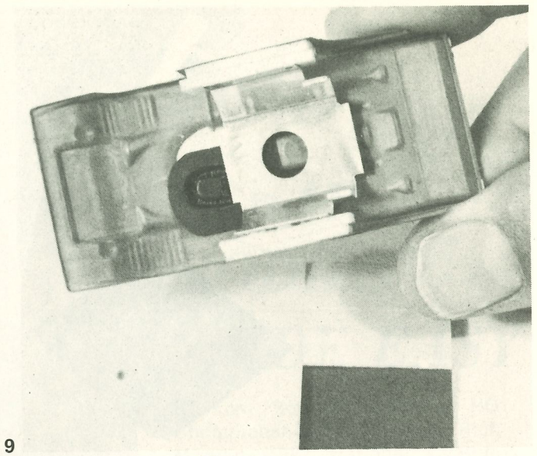

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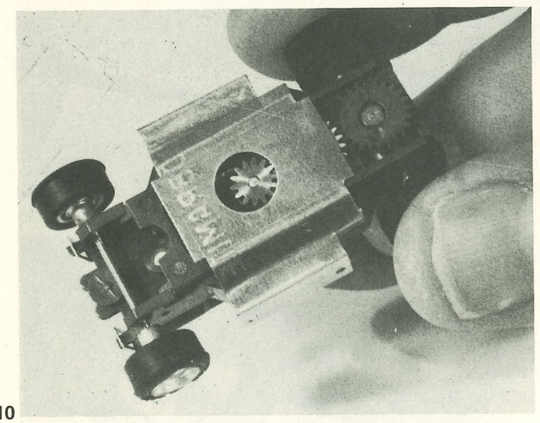

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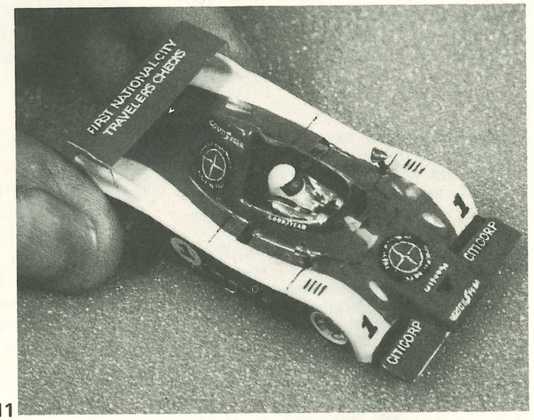

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practically any enamel, flat or gloss. Water-base plastic paints, such as "Polly S", are especially handy because mistakes can be washed off and brushes cleaned in water until the paint sets. Once the paint is dry, tho', it has 'cured' and water will not wash it off.

When painting the inside of the body, always paint the small details —such as grille openings, scoops, brake vents, etc.—first. You can then brush-paint the whole interior without worrying about those details. Some hobbiests prefer to brush-paint the details on the outside of the shell.

Auto World 1/64-inch striping tape comes in many colors and is just right for detailing or outlining door openings, window frames, hoods, and trunk lids. The larger sizes—1/16 and 1/8 inch—serve nicely as racing stripes.

Press-on lettering is useful for applying numbers and names: It may be purchased in art stores, hobby shops, and mail-order houses. Tapes, decals, and lettering used together can help you build many different-looking models very easily, since they don't require the fine hand-work it takes to do this detailing with brush or pen. You must, however, hand-paint your drivers with a very fine brush.

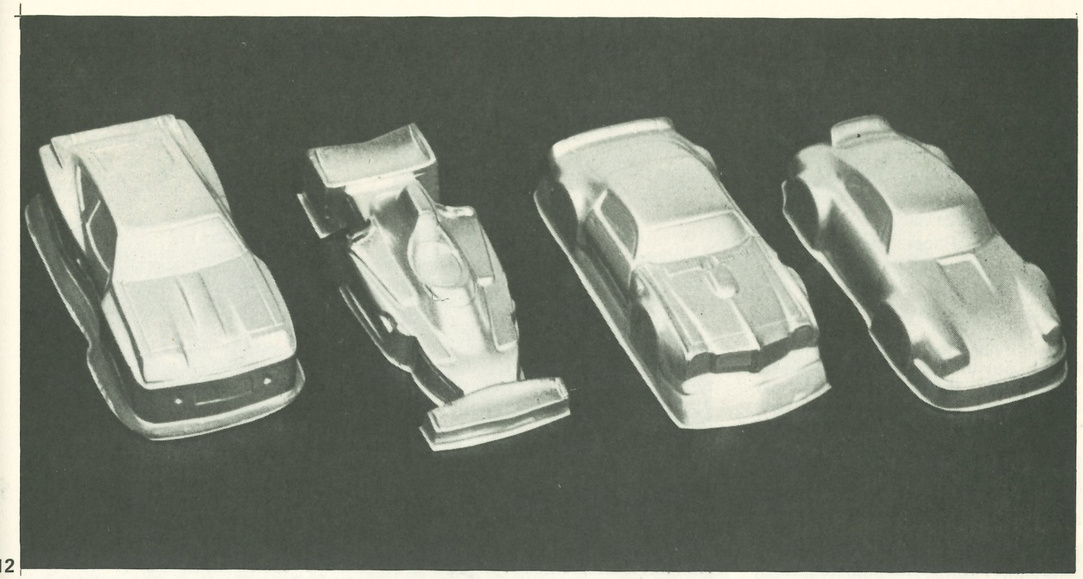
Once you've painted and detailed the body, the next step is mounting it on the chassis. I'm not sure that this shouldn't have been the first step, since some builders 'hang it on' first, then paint it afterwards.

A metal body clip that replaces the gear clamp on the AFX chassis works well with sedan-type bodies but must be reshaped for the wider Can-Am types. It's easily bent as necessary with long-nose pliers, as it is made of soft, thin brass.

Another versatile body mounting material is 1/8 inch-thick double-back sticky foam material which will adhere to plastic, metal, and even wood. Merely position small pieces of this inside the body shell where they won't show through the windows and press the body on the chassis.

No matter what body mounting method you choose, take care not to restrict the movement of the gear train or tires. The chassis should 'work' freely at all times.

Adding spoilers or 'air dams' to the bodies, as well as 'wings', is becoming popular. You can do this by using some of the excess material you trimmed off the body and cementing it in place using Lexan glue or mounting with small pins or HO-gauge locomotive valve-gear rivets. Details like this require some very fine work, however, and are often made under a magnifiying glass!



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8. Vac-formed bodies may be mounted by any of several methods. Here's the Auto World brass mounting clip that replaces the standard motor clamp on the chassis and doubles as a body mount.

9. Wide Can Am bodies can be fitted with 'Auto-Stick' mounts. These are 1/2 by 1 inch strips of double-back sponge tape.

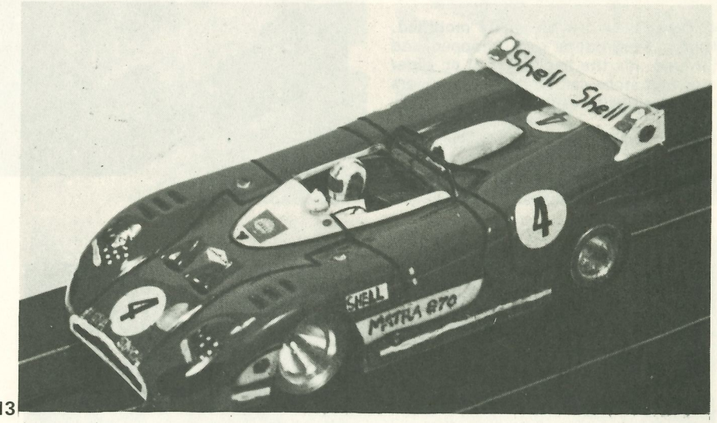
10. That Auto World body clip can be modified to fit cars of any width by bending with needle-nose pliers.

11. Chris Chan's Can Am Lola Chapparal used 1/16" diameter aluminum tubes, spaced apart to fit a Swingline paper staple. Holes are drilled into the chassis and the tubes epoxied into place.

12. Many types of clear racing bodies are available. Here from left to right are a Monza, Ferrari, Camaro and Porsche. Some bodies come with mounts. Some body mounts are available from your hobby dealer.

13. Midwestern racer Tom Bowman's Matra features a brass pan. By soldering 1/16" brass tubes to the pan, small pins can be inserted in the body sides to hold the body in place. Use two pins for each side.

14. The AFX G-Plus chassis is well adapted to clear body mounting, including the Formula or "open wheel" shells. Grand Prix road racing is growing in popularity throughout the world and the tiny, narrow G-Plus and Super Magna Traction chassis is widely used for these cars.



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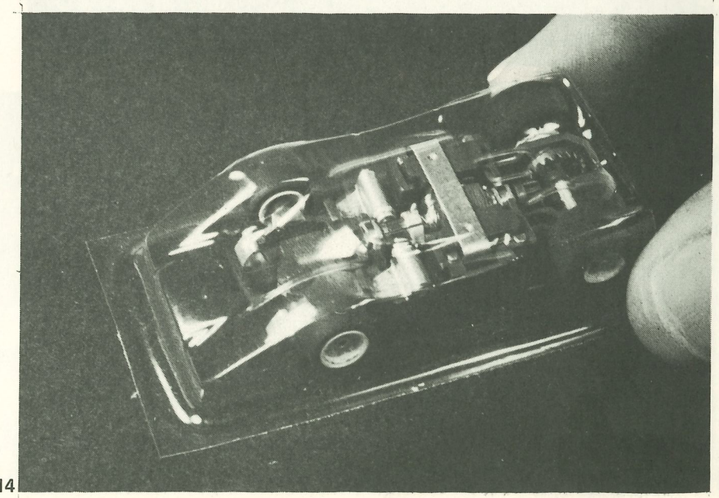

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QUICK BODY TRICKS MAKE A BIG DIFFERENCE

With a knife, file and some ingenuity you can create your own series of cars. Why not have a building and racing contest among your friends based on a special class or type of car?
1 is the Paper Racer, # 0 a Modified '55 Chevy. The fat rear wheels and tires are from the AFX special series.

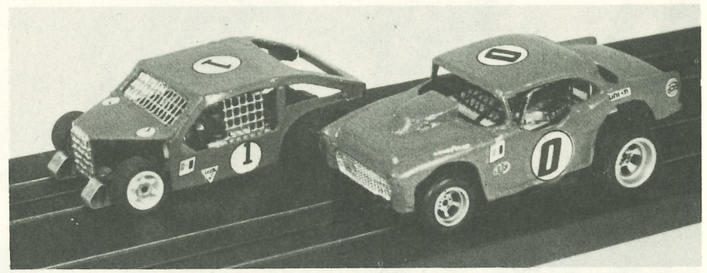
1. Modifying the Chevy was easy. Radius out the rear and front wheel wells, reverse the hood scoop and put on a wooden bumper painted to look like angle iron.

2. A roll cage was made up by soldering paper clips together. Screen was cemented on. The driver came from another AFX car.

3. Almost ready for paint and trim. A little more sanding and filing is needed to make it a perfect car.

4. Other cars can be easily modified. Here a Ford coupe gets chopped and lowered. It's the beginning of an older modified stock car. Note front bumpers made from wire staples.

5. Guess what this will look like when finished! A few coats of paint, some decals and some lettering will change its appearance easily.



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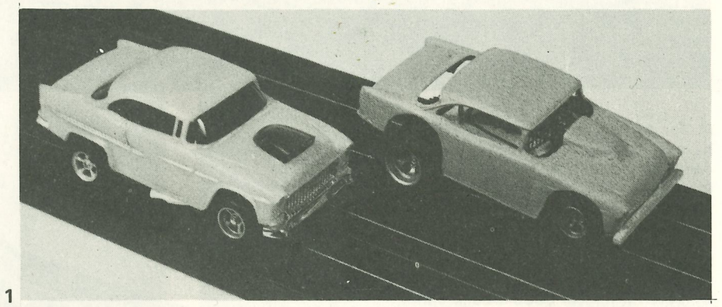

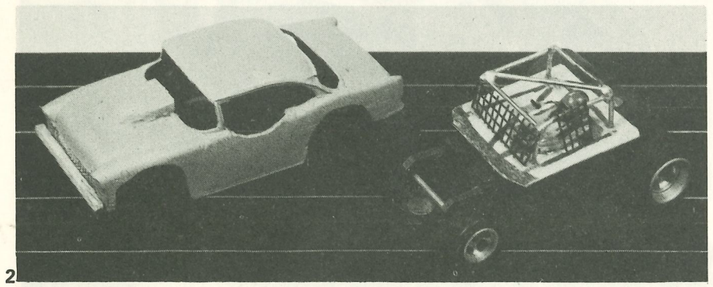

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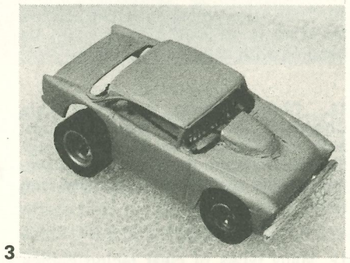

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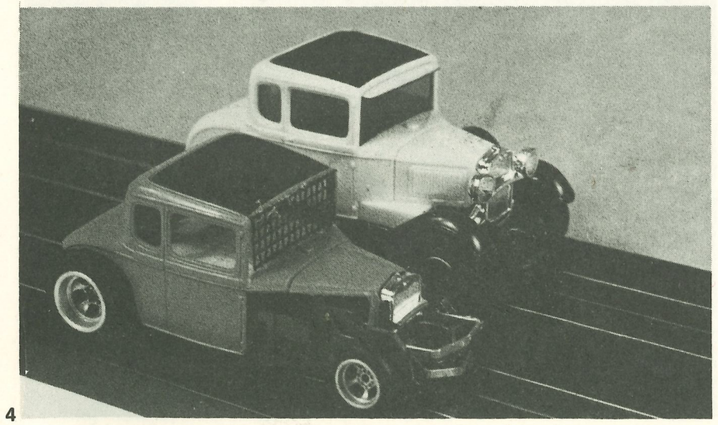

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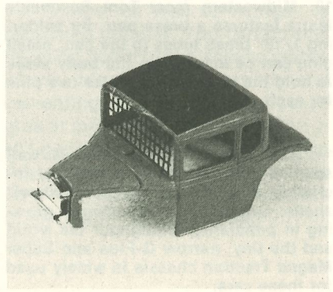
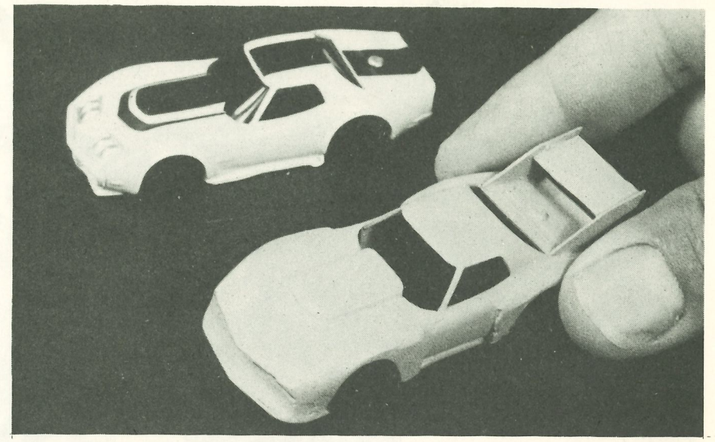


5

PUTTY AND PLASTIC - SUPER CAR

You can easily build some super AFX cars using a little ingenuity, plastic and putty. Here's how!

This SUPER CORVETTE was made from the standard AFX Corvette. All that remains to be done is a fancy paint job.



1. The wing was cut from thin sheet plastic like Plastruct, available in most hobby shops. It is easy to cut and easy to cement.

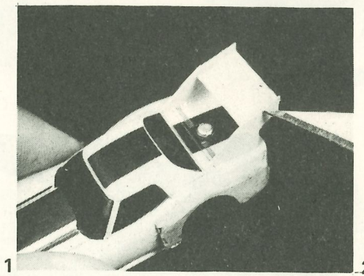
2. A piece of plastic was also cemented to the lower part of the nose. Plastic putty was then added around the fender wells, front spoiler.

3. A Jewelers' file will be a great help in working on these tiny bodies. Fine sandpaper glued to small pieces of wood also work well, even cuticle boards.

4. This Datsun is about to get a racing nose modification. The bumper and grill is removed, a piece of thin cardboard is cemented in place.

5. Putty is added to the fender to make it "wider" like the cars used in road racing. After the putty is dry, it is sanded and filed smooth. Any plastic body putty will work, including plastic wood or some of the hard drying putties found in hardware stores.

6. This Camaro has had a full treatment of putty around the spoiler, fenders and rear end. Add putty in thin layers so it will dry thoroughly, otherwise it will break and fall off.



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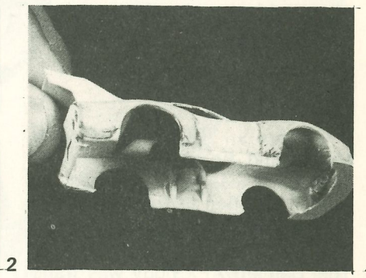

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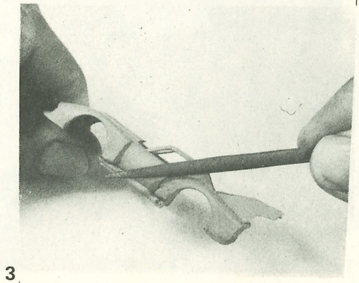

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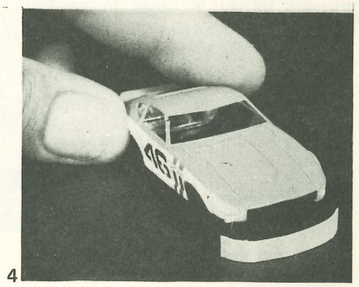

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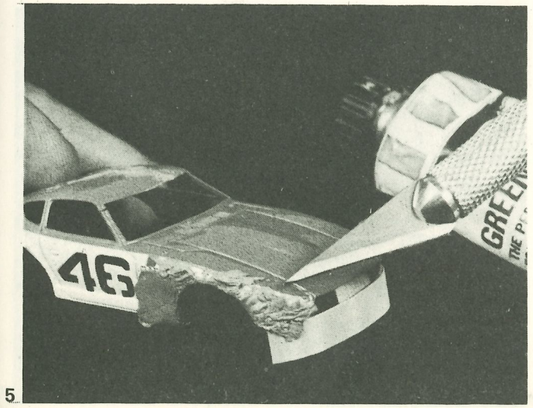

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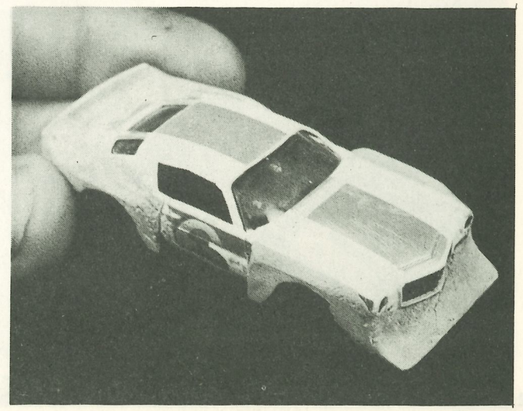

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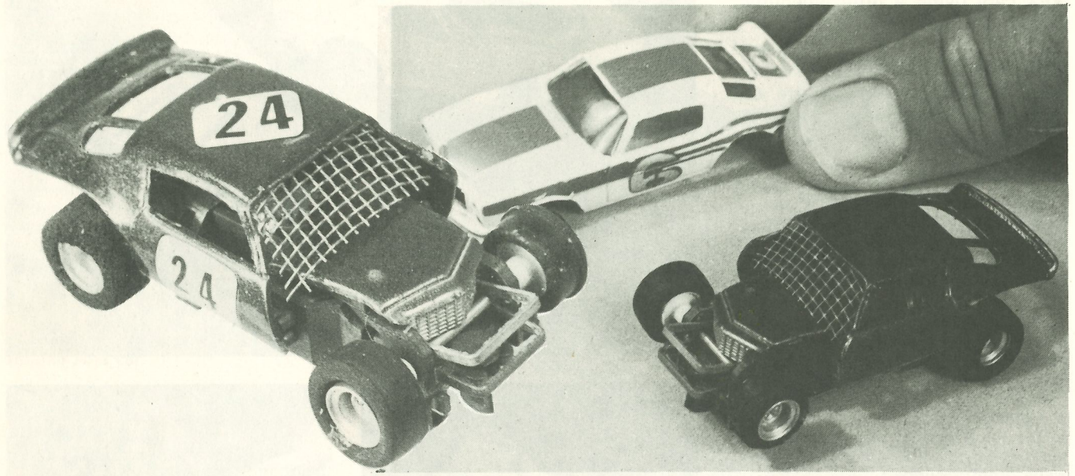
MODIFIED STOCKERS - FAST & LIGHT



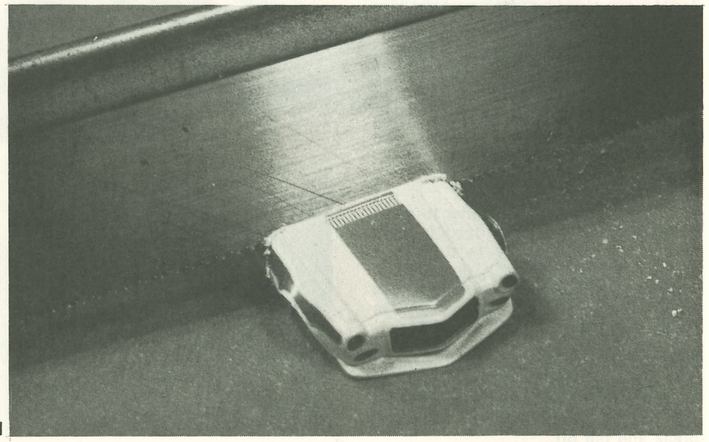
Camaro's, Chevy's, Dodge, Merc's and Ford's, you name it! They are all easily transformed into Super Modified Racers in a few minutes. Here's How!

This Camaro AFX body was transformed into this racer in several steps. Other than the AFX body, the only other items needed were some wire staples (bumpers) and screen.

1. Using a sharp razor type saw, saw off the front end.

2. Using a sharp razor saw, saw off the rear end below the wheel wells.

3. The rear section of the body looks like this. Simple, huh?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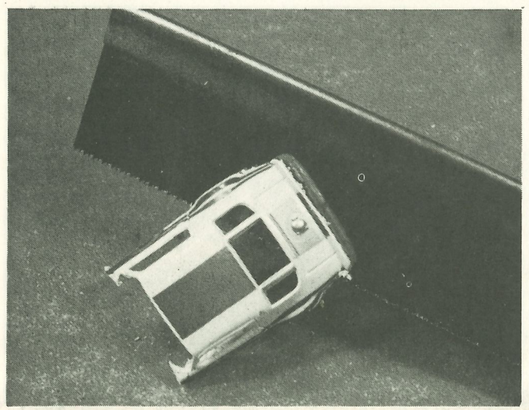
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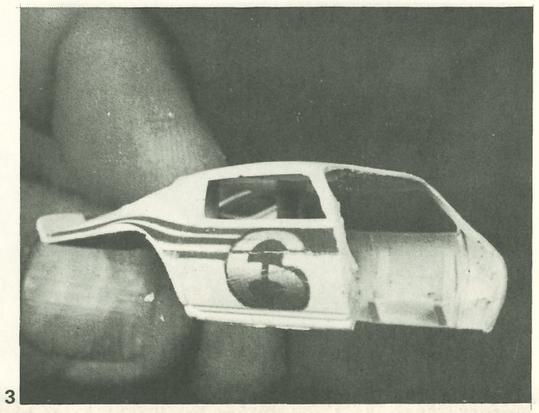
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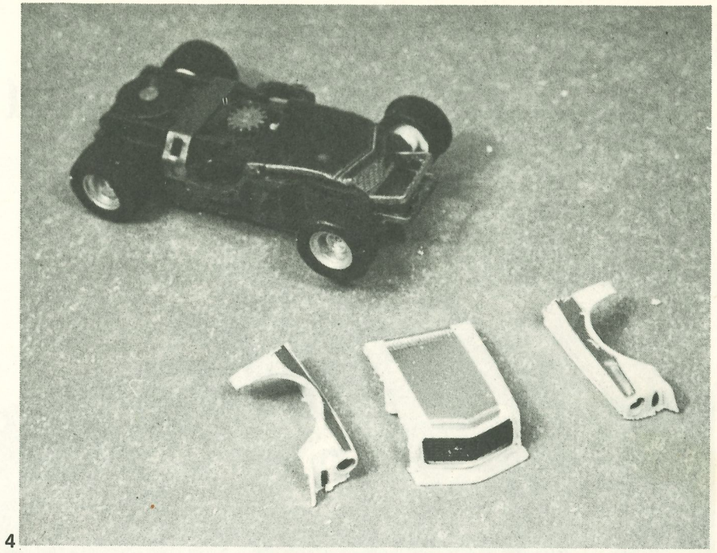
4. Using the razor saw, saw the front fenders off the front section.

5. Fit the front and rear body panels to the chassis. A small Jewelers' file will help.

6. Cement in the screen. The screen "windshield" makes it look "tough". Paint the body.

7. Epoxy the wire staples in place to act as "bumpers". Note how hood fits onto chassis.

8. The finished racer. Chopped, channeled, shortened, lightened. Ready to race and win!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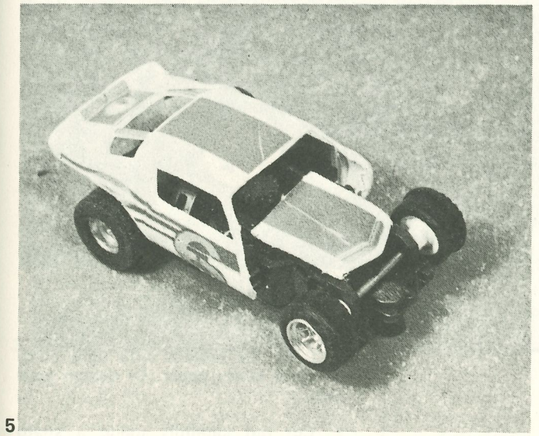
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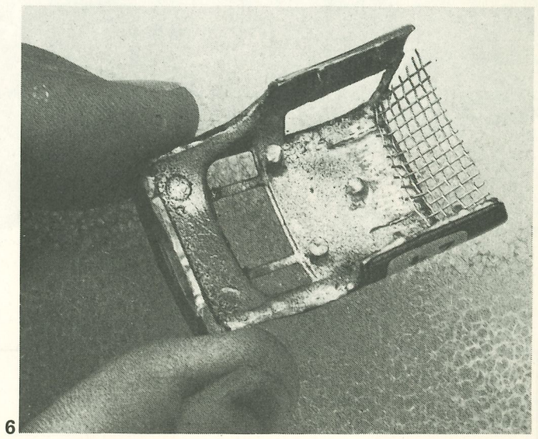
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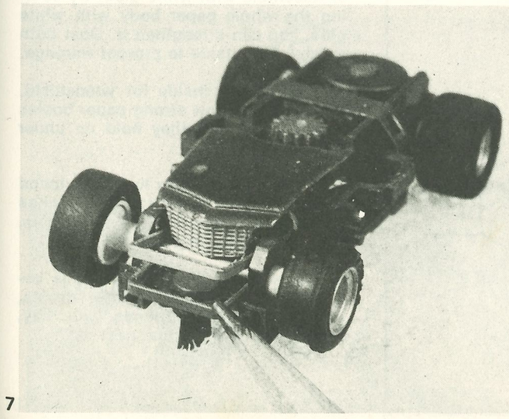
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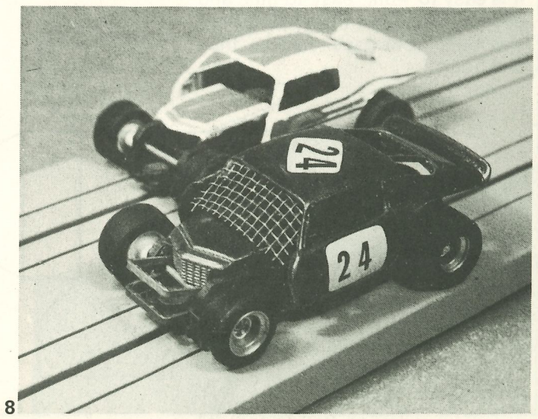

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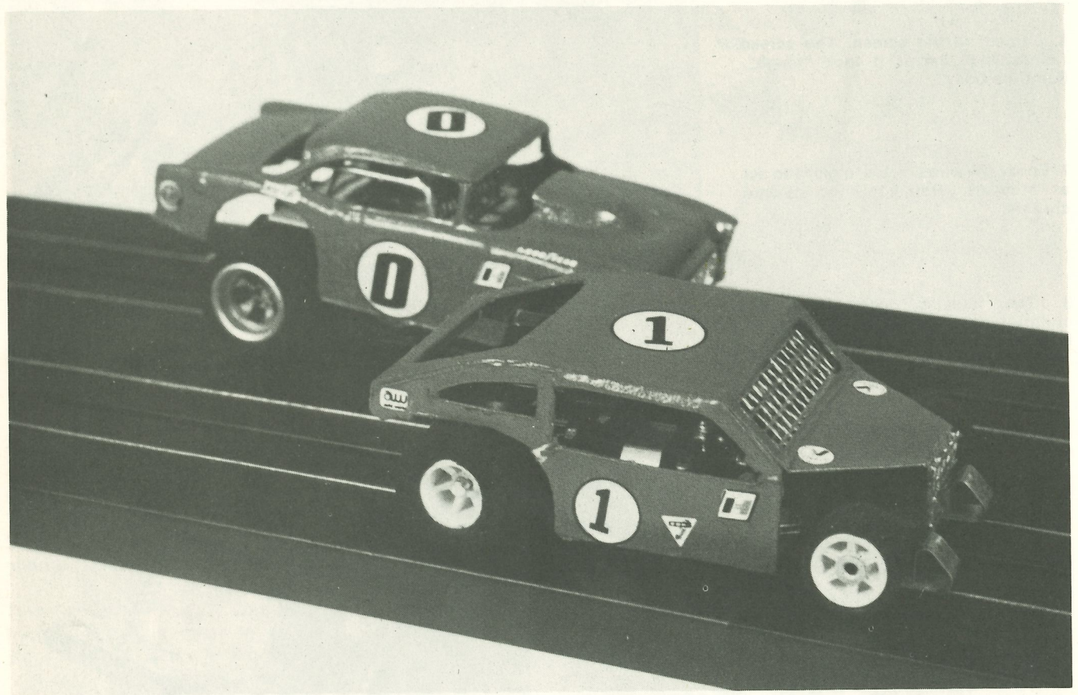
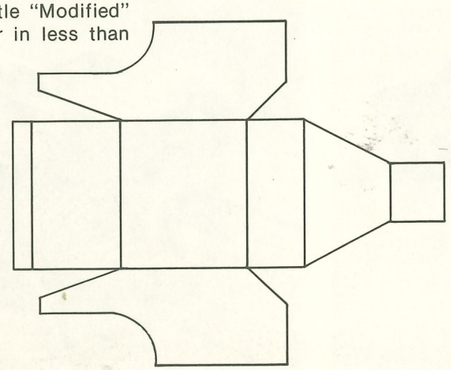
PAPER RACERS - A DIFFERENT WAY TO DO IT



Heavy paper or light cardboard can be used to make racing bodies for AFX cars. Here's How!

Paper is the ideal body material. It is easy to work, easy to glue and easy to find. This little "Modified" was built from paper in less than one hour.



1. Trace the pattern onto light cardboard or heavy paper. Or design your own.

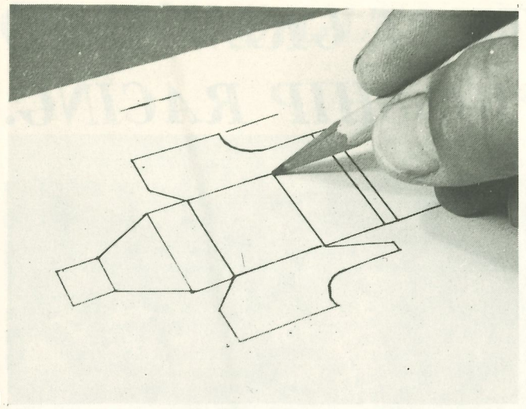
2. Cut out carefully using a sharp modelers knife.

3. Assemble with white glue. By coating the whole paper body with white glue, you can strengthen it. Coat both inside and outside to prevent warpage.

4. Glue screen inside for windshield. It's surprising how strong paper bodies are and how well they hold up under racing.

5. Double backed sticky foam tape found in stationery departments makes an ideal body mount. Stick to chassis, trim, stick body in place.

6. A few coats of paint and it is beginning to shape up. A few decals, names and your friends will say, "Where did you get that neat car?"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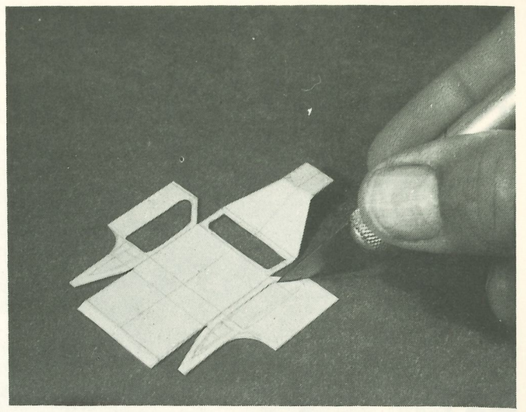
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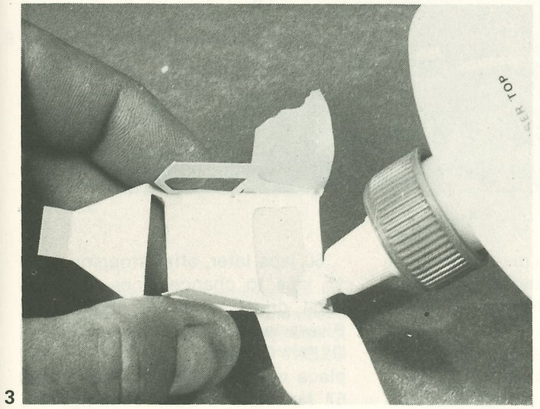
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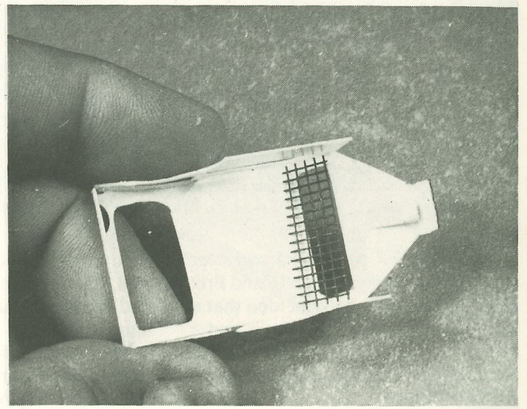
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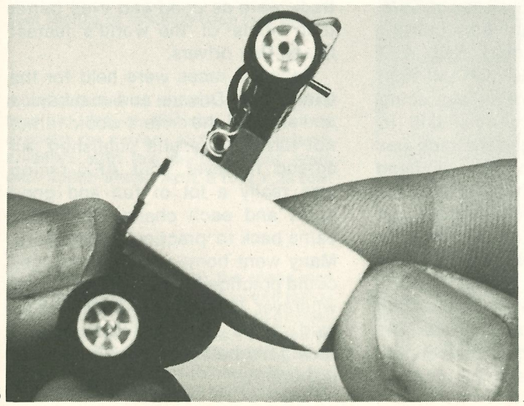
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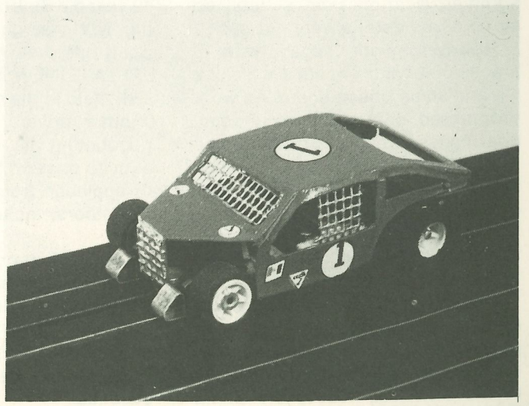
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THE RACING SET THAT GREW INTO WORLD CHAMPIONSHIP RACING.

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When an AFX set was named after the famous Watkins Glen Grand Prix course, someone had the idea that a bigger replica should be built and a major AFX race should be held on it. The simple set grew into a layout 8 foot by 20 foot!

Initial discussions laid down the guidelines. How it should slope, how many hills it should have, how many buildings, people, spectator's cars, etc. However, the project was limited to two young men during a summer vacation from school, so some of the details were cut back.

However, work began with 5 pieces of 4 x 8 plywood, 1 x 3's, 2 x 4's and some upson board. As work progressed, some swimming, some boating, some go-karting, some fishing, picnics and even a one week vacation went on in between, but the course was coming along nicely.

The schedule to have it ready for the real Watkins Glen U.S. Grand Prix race would be met.

Hauling it to Watkins Glen was another story, as it had to be completely disassembled, then reassembled in the Kendall garage at the Glen that houses the Grand Prix teams. The two major constructors, Sammy Ryan and Jerry Pauline had everything under control (Well, almost anyway).

Thousands of people witnessed the race and ohhhhh'd and ahhhh'd at the enormity of the track and hundreds raced and tried to secure one starting position for the AURORA AFX GRAND PRIX RACE in qualifying.

Four top qualifiers were chosen, timed by Aurora's Electronic timer. 12 year old Sherrie Guilbeau of Corning, N.Y. was guaranteed a starting position, by winning the AFX UPSTATE NEW YORK CHAMPIONSHIP held in the morning, out-racing 6 other drivers. Sherrie's skill in negotiating the large racetrack was a joy to observe and won a big hand of applause from thousands of the spectators, including the boys she beat!

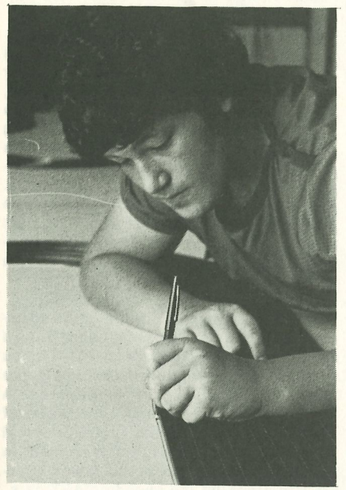
David Hawley of Newfield, N.Y., H. Witton of Madison, Conn., and Edwin Rivera of Cleveland, Ohio were the other three top qualifiers. The lap times for these qualifiers on this track ranged between 7.7 and 7.8 seconds.

60 laps later, after stopping each 15 laps to change lanes and give each driver an equal chance, Ed Rivera won the AFX WATKINS GLEN GRAND PRIX RACE. 2nd place went to Sherri Guilbeau with 57 laps and 8 track sections, 3rd place was awarded to H. Witton with 53 laps and placing fourth was David Hawley with 48 laps.

This championship was limited to drivers of 14 years of age and under, and their actual racing times on the track were as good and even better than some of the world's fastest Grand Prix drivers.

Separate races were held for the Grand Prix Drivers and mechanics and some of the drivers would rather not have the results published. All agreed however, that AFX racing was really a lot of fun and good sport and each chance they had, came back to 'practice' a little more. Many went home with sets so they could practice for the next AFX race, wherever it may be. As one driver said, "If I'm going to do this type of racing, I'd better find out how to do it properly!"

WATKINS GLEN REPLICA - THE BIG ONE!



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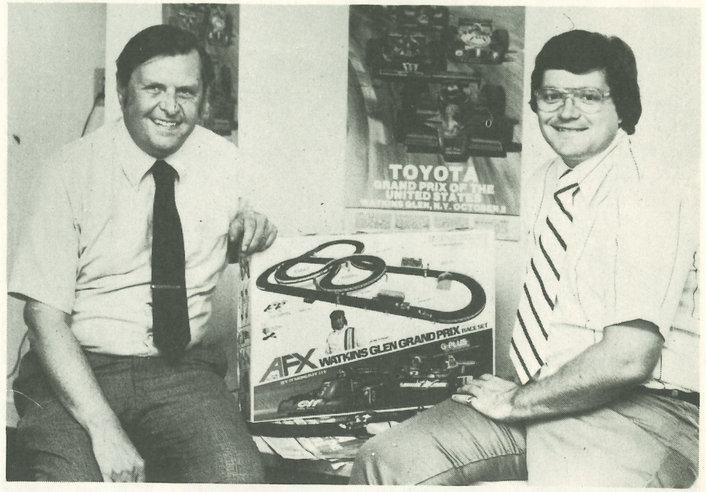

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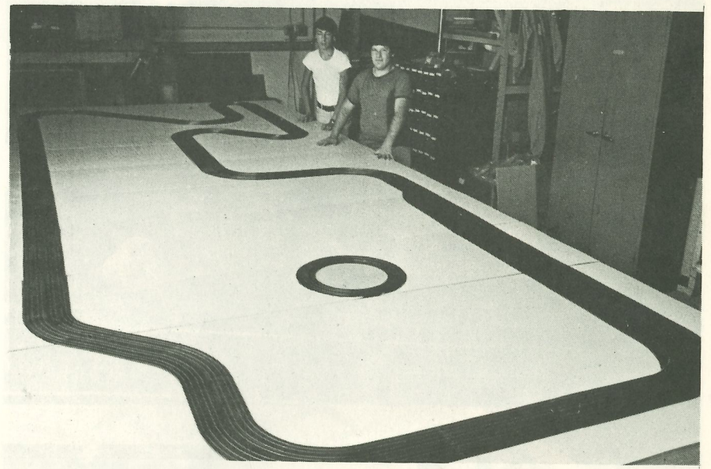
1. The Aurora AFX U.S. Grand Prix at Watkins Glen. Hundreds of AFX drivers came to Watkins Glen to qualify, during the Toyota U.S. Grand Prix. The 8' x 20' Watkins Glen replica track was constructed entirely of Aurora AFX track on tables as described in building a racetrack.

2. Sammy Ryan, Chief Engineer on the project outlining the track on the upson board. Sammy did most of the cutting, painting, soldering and wiring with his assistant, Jerry Pauline.

3. Mal Currie, Executive Director of Watkins Glen Grand Prix Association and Pete Johnson, Director of Marketing with the 1st AFX Watkins Glen racing set. From this set and using additional track and accessories, the giant 8 x 20 foot replica of Watkins Glen was built.

4. An overview of the track layout gives you an idea of the size. In order to stabilize the current, all track joints were soldered with low melting point rosin core solder underneath. 8 foot x 20 foot is BIG!

5. Painting and detailing the roads was done by rollers, paint brushes and masking tape. Tables bolt together underneath and tracks were designed so that removable sections were lying directly over the table joints so that the replica could be dismantled and transported.



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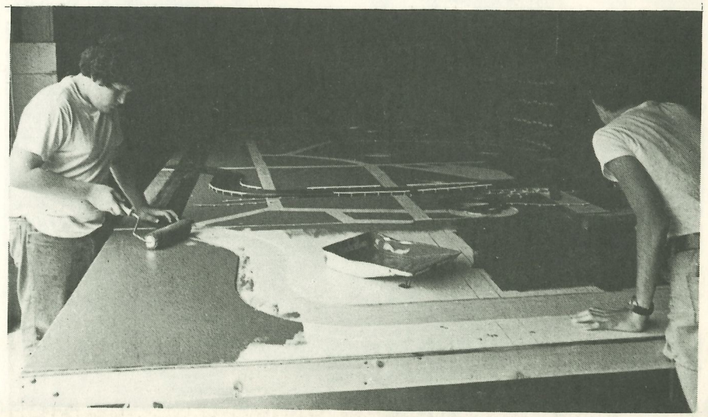

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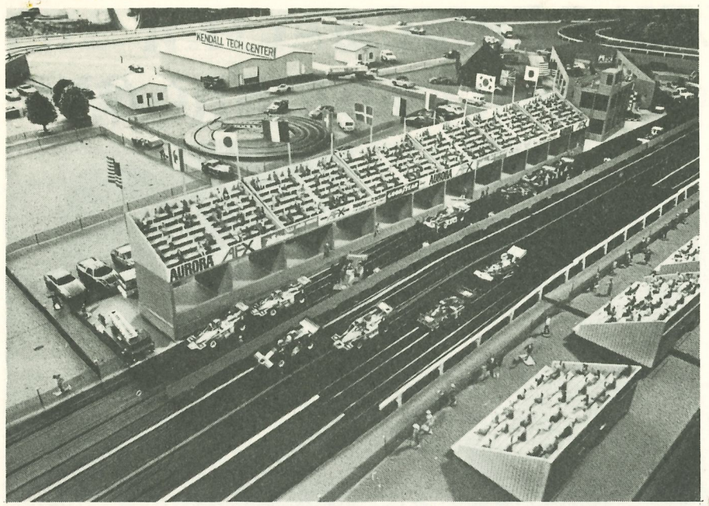

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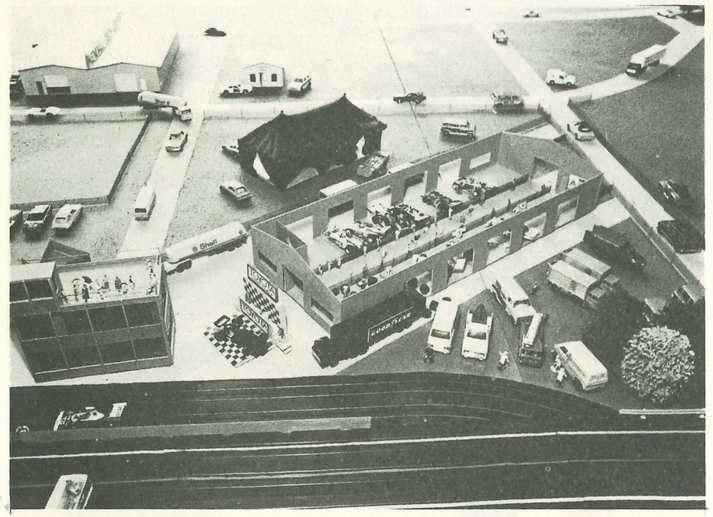

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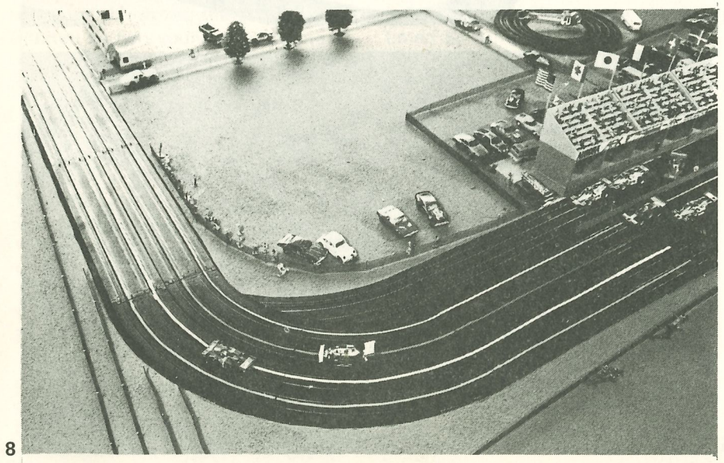

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6. The pit structure was constructed of Aurora AFX Grandstands and 1/8" sheet balsa wood. The pit lane itself used straight track and was separated by retaining walls painted a cement color. HO people were added, plus fencing and the international flags. The flags were purchased at a party supply store.

7. The buildings were constructed from poster board and cemented together with white glue. While not to exact scale, they are good representations of the Watkins Glen track and add interesting detail to the layout. Here is the famous Kendall Garage with the roof off, showing the teams working on their cars. Spectators are allowed inside, and in the far righthand corner of the building, this layout was on display. Thousands viewed it and raced AFX during the Toyota U.S. Grand Prix.

8. Turn one after the pit straight is an action spot on the real track, and it proved to be an action spot on the AFX layout as well. Being downhill, it fools you if you go too fast and you wind up in the catch fencing, an experience that even some of the Grand Prix drivers shared in the real cars. Made from plastic screen, held in position with pins as posts, it was effective in stopping the speeding AFX cars.

9. Ed Rivera won the Aurora AFX Grand Prix race at the Glen. He came to race and race he did. As one of the hundreds of contestants Ed qualified for a starting position in the race and drove steadily and confidently. The race was held during the Toyota Grand Prix of the United States and Ed took the laurels and trophy to Cleveland, Ohio, his home town. The top four finishers in the race are below.

Ed Rivera, Cleveland, Ohio 1st
Sherri Guilbeau, Corning, N.Y. 2nd
H. Witton, Madison, Conn. 3rd
David Hawley, Newfield, N.Y. 4th

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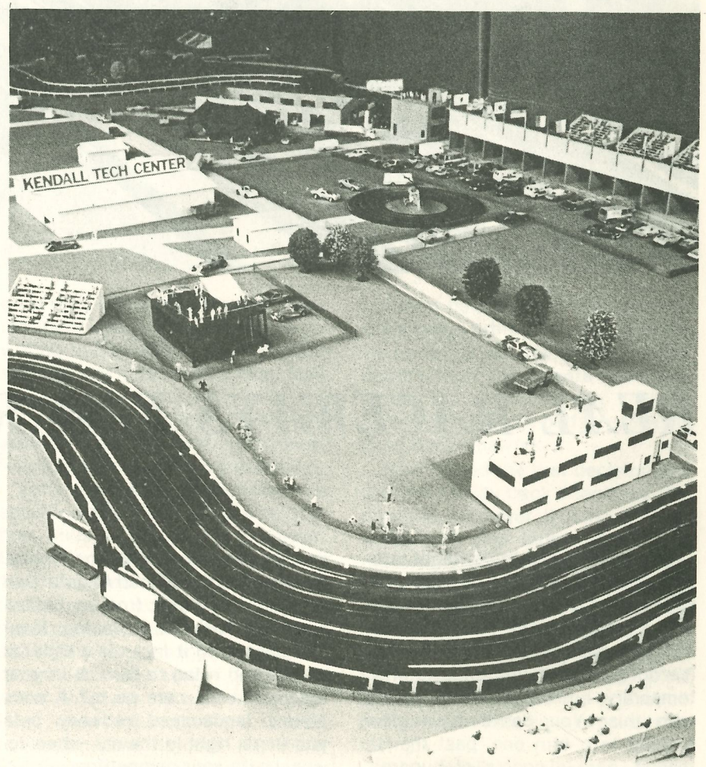
10. Sherri Guilbeau of Corning, New York, won the Aurora AFX Upstate New York Championship. Qualifying in a nearby mall, Sherri went to Watkins Glen and raced off with 7 other contestants to take the title home to Corning, New York. Thousands of contestants tried Aurora AFX racing in selected malls promoting the Toyota U.S. Grand Prix, and each mall winner received tickets to the big race. There, they raced off for the championship. Here are the city winners and how they finished.

CITY AND UPSTATE NEW YORK CHAMPIONSHIP WINNERS

CITY WINNERS	UPSTATE CHAMPIONSHIP
Sherri Guilbeau, Corning, N.Y.	1st
Randy Wheeler, Rochester, N.Y.	2nd
Bob Pusatari, Elmira, N.Y.	3rd
Terry Bigalow, Buffalo, N.Y.	4th
John Webster, Syracuse, N.Y.	
Bryan Beck, Ithaca, N.Y.	
Rob Marashian, Utica, N.Y.	
Joe Ash, Binghampton, N.Y.	



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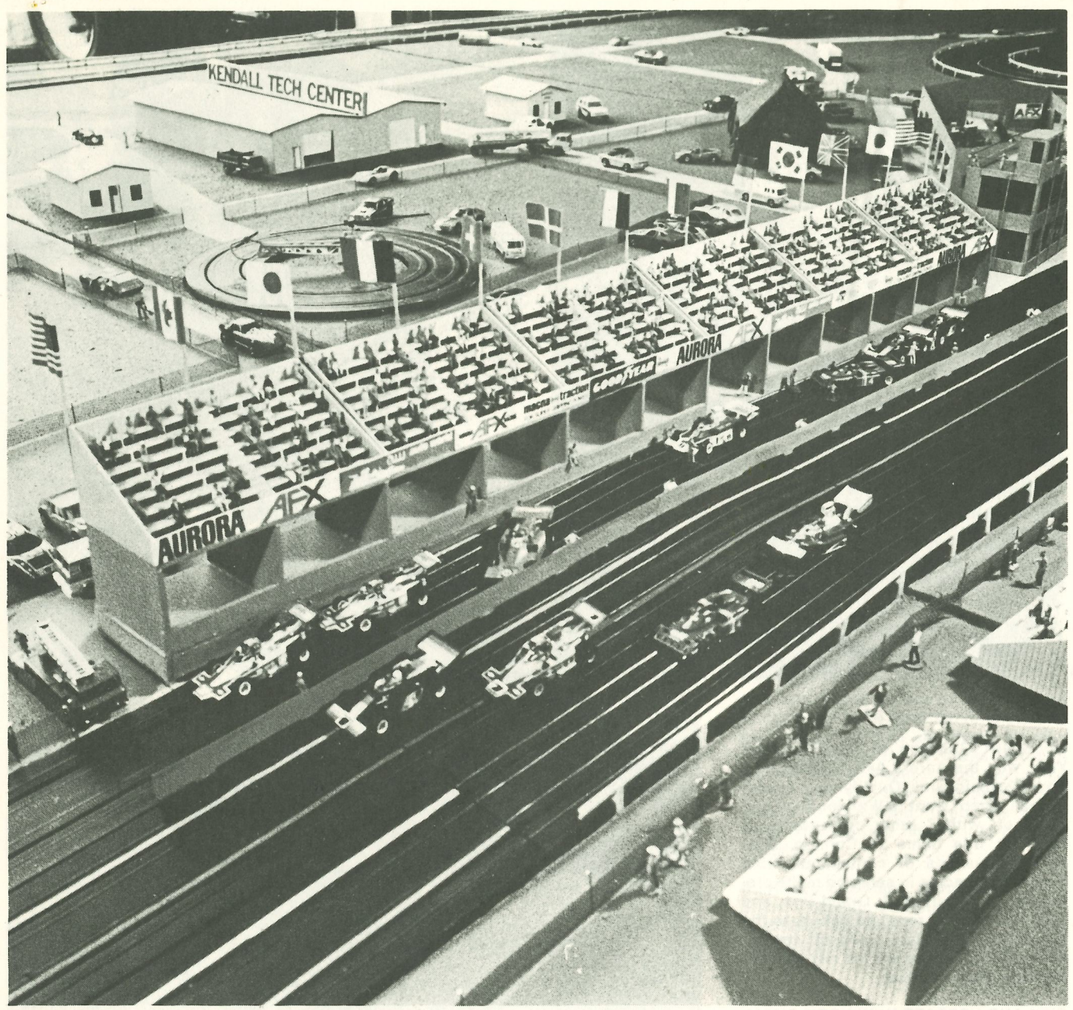
11. The difficult "Esses" near the Glen Paddock Club and Kendall Service buildings are always action packed. The "Esses" pinch down into a one lane Chicane; only one car at a time can get through. As you crest the hill, the cars get light and lose traction. It's a difficult spot to drive and a great spot to spectate.



REAL RACEWAYS FOR REAL RACES

You barrel down the straight into turn one, fly off the corner and knock over a water glass 'cause you're racing on the kitchen table. Not very realistic, is it? Of course, it's not so bad if the setup is only temporary, but compare that scene with this: You barrel down the straight into turn one, past the '1' marker, past a couple of hundred spectators, a row or two of trees, and a grassy slope with snowfence. The sounds of the Road Atlanta 'Can Am' fill the room from a hidden speaker. That's REAL racing, Man! The only thing it lacks is a little oil smoke and a fan to blow it in your face while the cars go by! A completely landscaped raceway puts you there, right in the car, wheel-to-wheel with your competitors.

The art of model layout landscaping began with model railroaders and is an exacting, creative hobby if ever there was one! Much thought is required on how to make hills, grass, trees, lakes, mountains, rocks, and waterfalls and how to make the colors blend together, as they do in nature, for the utmost realism. We're lucky that model car racing can bring us into this fine hobby. More and more people are building and

BUILDING A REAL RACE COURSE COULD COST YOU MILLIONS OF DOLLARS

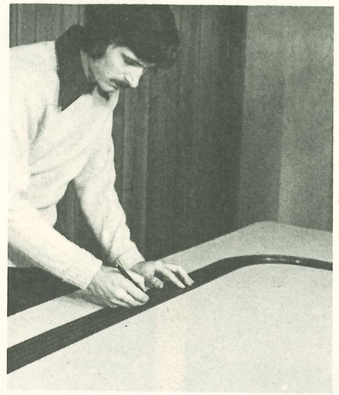
but, for a few dollars and cents, some time and effort, you can capture in miniature all the realism of a full-size raceway. Here's how it's done:

1. Assemble track on wallboard or plywood and mark its outline after you've raced on the layout and are satisfied with the design.

2. If you plan to 'sink' the track into the wallboard, cut out the marked areas with a power saw, using the knife-type blade. This blade makes less dust.

3. Reinstall the track in the cutout wallboard and mark its depth with a pencil. If you want to leave a raised 'curb', keep the edge sharp.

4. Use a sharp knife to 'feather' the edges of the wallboard to meet the track. Make this a gentle slope, rather than a steep cut.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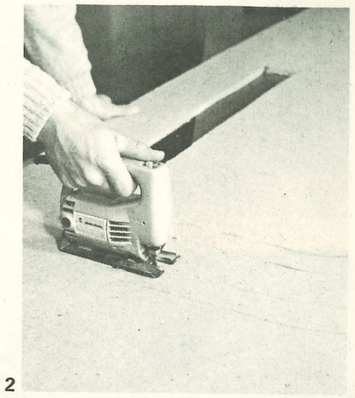
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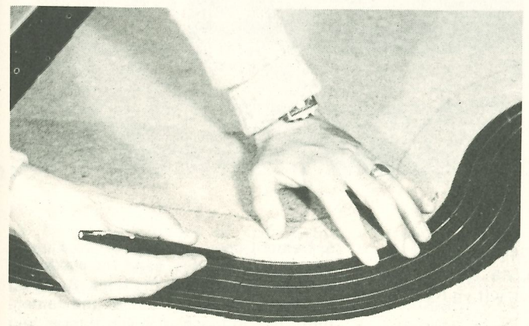
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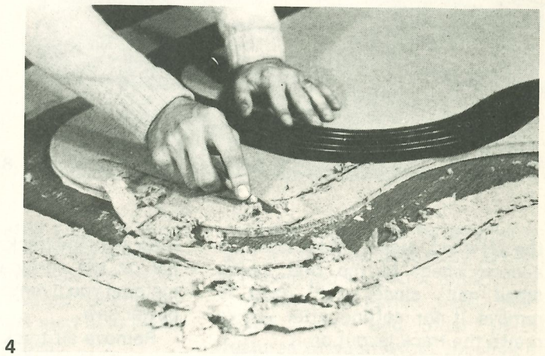
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landscaping permanent AFX racing layouts.

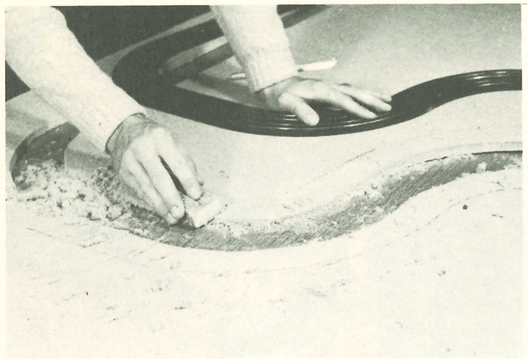
Where to begin? Well, let your imagination capture these sights: The beautiful rolling hills, marvelous trees, and green grass of Road America. The arid banks lined with spectators, overlooking the sand-blown esses at Riverside. The cars screaming down the long straights walled in by miles of guard rail at Watkins Glen. The uphill and downhill turns on the red Georgia clay at Road Atlanta. There are these and hundreds of other sights at the real raceways, each having its very own personality, each offering the modeler a challenge to recreate it in miniature—or a challenge to design and build a better raceway.

Whenever you visit a real racecourse, take color photos of each turn. Get a program and study the track layout. You might also try writing to the racecourse office and ask for any information that they might be able to supply to help you build your layout. Knowing what you want to build is of first importance, followed by knowing how to build it.

Let's assume you've decided on a specific track plan and its size. The first step is to build a platform. Generally, it will be constructed of 1-inch by 4-inch lumber in a simple rectangle, corner-braced if necessary. A cross-piece or two will add rigidity, and the joints should be assembled with screws and glue rather than merely nailed. Two-by-fours make adequate legs, or use four-inch-square lumber for extra sturdiness. Diagonal braces to the legs are good insurance. Make the platform height about the same as the average table (28 inches) or a little lower so you can see the entire course from the drivers' position. Cover the platform with 1/2-inch plywood, nailing (or better, screwing it) to the framework.

Now comes the first decision. Do you want to lay track directly on the plywood, or cover it with 1/2-inch wallboard? The latter material is reasonably inexpensive and results in quieter, more realistic running. If you go that route, you may want to consider investing in a second piece of wallboard so you can sink part of the track below 'ground level'. This allows more flexibility in layout design and makes for more realistic racing.

If you decide to sink your track, nail the first sheet of wallboard to



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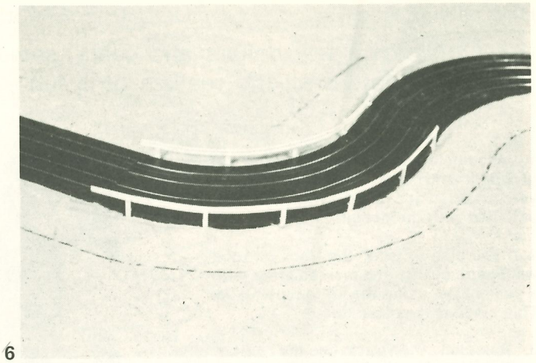

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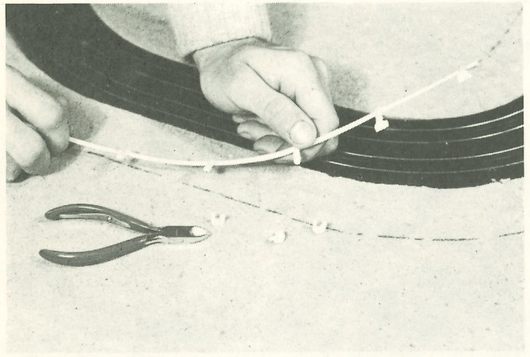

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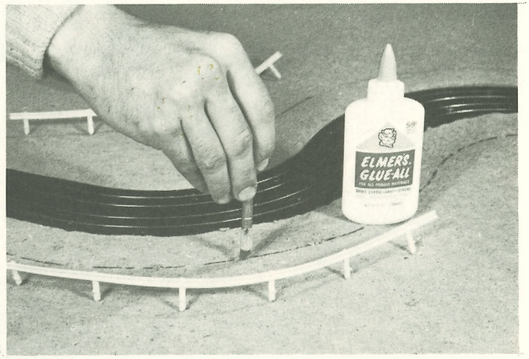

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the plywood. Next, lightly tack the second sheet to the first, using small nails since you'll need to remove it for cutting after you've drawn the track layout on it.

Assemble the track on top of the wallboard. If you've chosen an over-and-under layout, you'll need tunnels and/or bridges. Position the track where you want it, using books or wooden blocks to raise the 'over' track sections. Tack the track in place lightly. At this point, you might want to make a few practice laps to see if you like the layout and to make sure you can see the cars most of the time.

Once you're satisfied that the track design is what you want, you can nail the track in place and start replacing the books or blocks of wood with permanent supports. If you've decided to sink the track below 'ground level', omit the previous step and substitute the one that follows:

While the track is still lightly tacked in place, take a ballpoint pen and transfer the exact track layout to the wallboard. Do NOT draw the overhead tracks on the wallboard! Draw only the track sections that lay flat on the surface, as this is the material you'll remove with a hand or power saw.

Remove all track and cut out the marked-off areas. Wallboard is 1/2 inch thick while the track is only 1/4 inch, so there'll be a 1/4-inch difference. You can 'shave' this down with an electric sander, rough plane, or even a saw. Finally, nail the wallboard with its cutouts to the base sheet and right on through to the plywood.

Wallboard makes excellent material for cliffs and hills. Just lay it on the edge of a table and break it off with a hammer or 'karate chop' to produce a rough, stone-like edge. Cement several pieces together to make supports for the overhead track, using white glue.

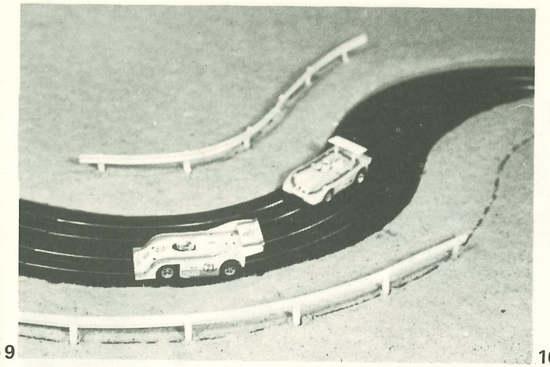
Another method of making elevated terrain in miniature is to use blocks of wood under the track (such as 1-inch by 3-inch strips). Tack aluminum screening to this, shaping it roughly to the contour desired. Cover the screening with wood fiber mortar, plaster, plaster of paris, or any other similar material. These and the other necessary items we'll discuss shortly are available at hobby shops and department stores that carry model railroad supplies. You'll find it's easiest to locate them in the Fall or Winter, at the height of the Holiday Season.

5. Cement coarse sandpaper to a block of wood. Using this, sand the wallboard to the line, even with the track. By piling wallboard pieces at a corner and cementing them in place with white glue, you can make mountains of sand or painted earth.

6. The Aurora guard rails may be fitted to the track, but that's not really scale. The rails are supplied so average racers can fit guard rails to their tracks.

7. Make your own guard rails or clip the feet off the Aurora No. 1532 rails. Draw a line a reasonable 'escape distance' back from the track edge: This is where you'll mount the rails.

8. Drill holes in the wallboard with a knife, drill, or even the tang of a big file. This material is soft and easy to drill. Fill the holes with white glue and set in the guard-rail posts.



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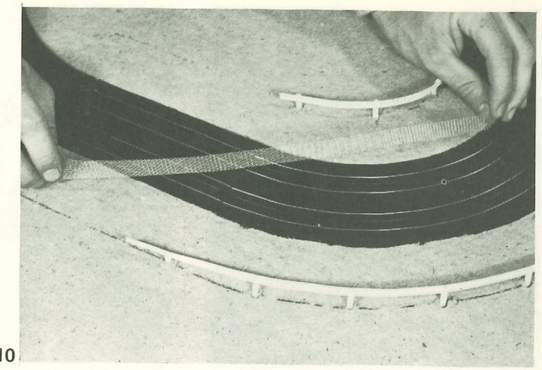

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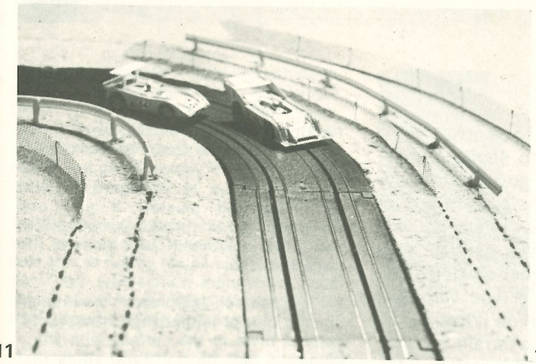

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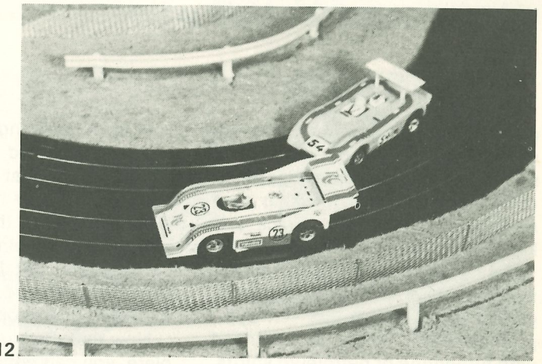

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9. On some sections of your layout, you'll want to use guard rails only. This is how the setup looks before adding grass and trees.

10. Making chain-link fence is easy. Buy some aluminum window screening and cut it into one-inch strips on the diagonal so it looks like the real thing. To further increase its realism, stretch it while installing and it will tighten up.

11. Chain-link fencing is used on the inside of the rails as a crash barrier to slow down a car before it contacts the steel Armco guard rails. For that reason, the chain link is usually fastened to wooden posts, sometimes partially sawed thru to break off on impact. Installed on the outside of the rails, opposite the track, it keeps spectators from getting too close—a distance usually determined by the insurance companies.

12. The easiest way to install our 'chain-link' fence is with regular straight pins. Cut off the heads, then bend the end of the pin to hook shape and fasten down the fence. Paint the pins brown to resemble wooden fenceposts only on the track side of the guard-rails.

Okay! You now have your track nailed to the wallboard, the elevated sections blocked up with wallboard scraps or wood-strip supports, and the cliffs or slopes at the sides of the raised track formed from wallboard or covered aluminum screening. The next step is to make the tunnels or bridges.

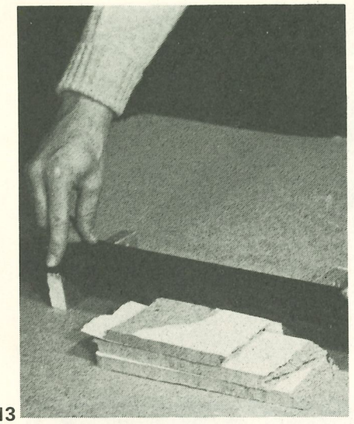
Tunnels can be made by cutting appropriate arch-shaped openings in wallboard, masonite, or even heavy cardboard. Stone facings may be added, but there are very few race courses in the world with tunnels and even fewer with stone fronts! Tunnels are taboo in modern courses. Guard rails and catch fences are the thing: We'll describe how to make these later on.

Bridges are of so many different types, it would almost take a separate book to describe them all. Most race courses, however, use steel girders under bridges and suitable spans are available in HO model railroad shops. A railroad bridge could be modified to work, or you can build your own from Plastruct, basswood, masonite, balsa wood, or similar materials. In fact, the Plastruct Company lists bridge plans and kits in their comprehensive catalog/handbook. These are designed for HO-scale railroads, but could be lengthened and widened as necessary to carry (or span) the wide AFX track.

Adding the earth, grass, trees, brush, rocks, and other natural features to your layout requires an artistic taste and a 'feel' for the out-of-doors. Study pictures of real terrain, especially that around a real race course, with special attention to the colors. Try to capture the feeling of these in miniature. If you're successful, you'll receive many compliments on how 'real' your layout looks.

If you're doing Riverside, you needn't worry about trees, rocks, and grass. It's pretty sandy, has a lot of blacktop, some concrete, concrete walls, guard rails, garages, grandstands, gas station, and some bridges. It also has a lot of beautiful girls, so buy a lot of those when you shop for HO scale people. On the other hand, if you're trying to capture the spirit of Road America, Road Atlanta, or Watkins Glen, you'll be interested in how to create their type of scenery in miniature.

After the cliffs and mountains are finished and the plaster (or whatever) is thoroughly dry, painting



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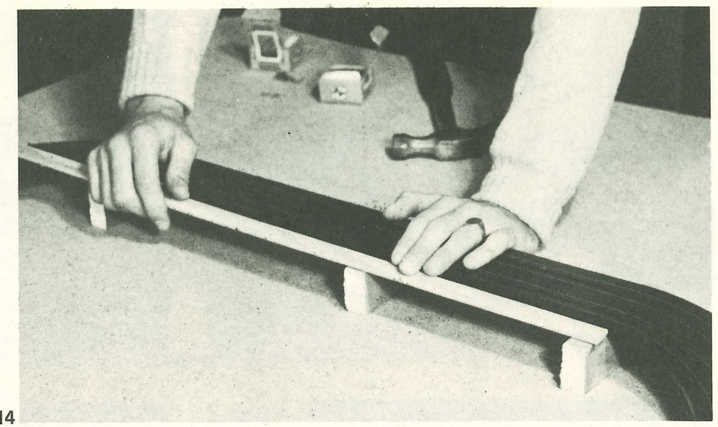

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comes next. Before you begin adding colors, apply a coat of sealer (or shellac) to the wallboard, plaster, or other surfaces. Use masking tape and paper to cover the track and keep paint from getting all over it.

Use flat, water-base paints in suitable shades for dirt, blacktop, grass, and sand, or—if you prefer—artists' colors in oil thinned with turpentine or petroleum spirits. In the latter, burnt and raw sienna, and burnt and raw umber will give you the basic 'earth colors'; lampblack in oil is good for macadam roads and parking-lot surfaces (and may be added to zinc oxide white for the grey of concrete). Select other colors as needed from the wide range available. A little of these pigments go a long way, so purchase the smallest tubes you can find.

Hobby shops sell boxes (or polyfilm bags) of specially prepared materials that give the illusion of grass and dirt. Buy a couple of these and, while you're at it, look at the grey ground-up cork used to simulate gravel and rocks. To apply any of these materials, dilute white glue (such as 'Elmer's') with water, add a few drops of detergent to keep it from bubbling, and brush this over the painted surfaces (but only after the paint is thoroughly dry!) Sprinkle a liberal coating of the 'earth' or 'grass' material on the desired areas and let the glue harden. Any loose material should then be removed with a vacuum-cleaner or it may get into the 'works' of your cars.

The 'grass' and 'dirt' materials will give a beautiful, realistic effect but if your layout is going to be near a window and exposed to sunlight, you should spray flat green and flat earth colors over the treated areas since, otherwise, they'll fade badly.

You may find similar uses for the sawdust you get from sawing and sanding wallboard, or you can use real sand in appropriate areas.

Now that the basic terrain is complete, you can consider getting into such details as buildings, spectator areas, pit areas, concessions, garages, and the paddock. All these make up a raceway. Their locations are generally indicated in race programs, so it's a good idea to accumulate such programs from a number of tracks to see where these areas are. Not all of them are the same and, again, this makes modeling them more interesting.

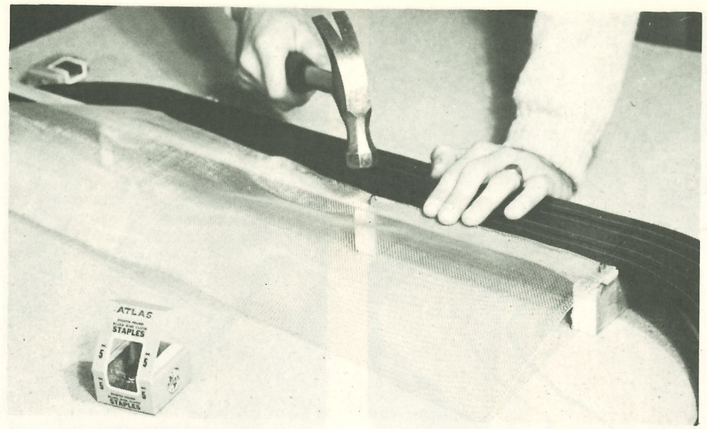
Take, for example, the pit area. Generally referred to as 'the pits', this part of the track plant is usually located near the start/finish line and close by the timing and scoring building. Likewise, the pits are usually on the inside of the track so that when a car pulls out on the track, it's on the inside lane of traffic. For the most part, driving is done on the outside of the track in a race, except when cutting the corners (or "apex") at the turns. The pits are where the cars come in to take on fuel, change tires, or for unscheduled repairs. Tracks that don't run International or distance races have very sparse pit areas. Courses like Watkins Glen have the most elaborate. Pit credentials ('passes') are issued only in limited numbers to the participants, their crews, and track officials.

13. One-inch wood blocks are an easy way of raising the track. Before cutting them, decide if you're going to make your mountains of wallboard or with screening and plaster. If you use wallboard, cut the blocks to track width so the wallboard will stack close to the track sections.

14. For screen-and-plaster mountains, cut the blocks longer than track width, cement them to the surface with white glue, and tack on the wood strips that will support the screening.

The paddock area is adjacent to the pits. This is a 'holding area' where teams, trailers, and competitors' families park, often camping overnight. Again, this is a 'restricted area' and special credentials are required for entrance. Tracks often sell paddock passes to the general public, however, when such individuals wish to see the cars close up and talk with the drivers and their crews.

Spectator areas are selected to provide the best vantage points, but with a view toward safety. For example, you'll never see a spectator area at the end of a long straight before a turn, where a car may break something, become airborne, and fly into the crowd. On such a turn protective fence will be installed; a grandstand might be found on the inside of the corner. Hills overlooking 'sweepers' and turns are good spectator spots, and a clump of trees may often support anywhere from ten to twenty race fans in its branches.



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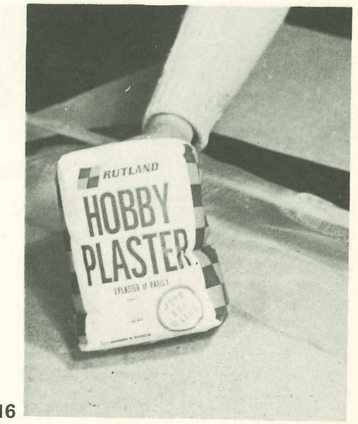

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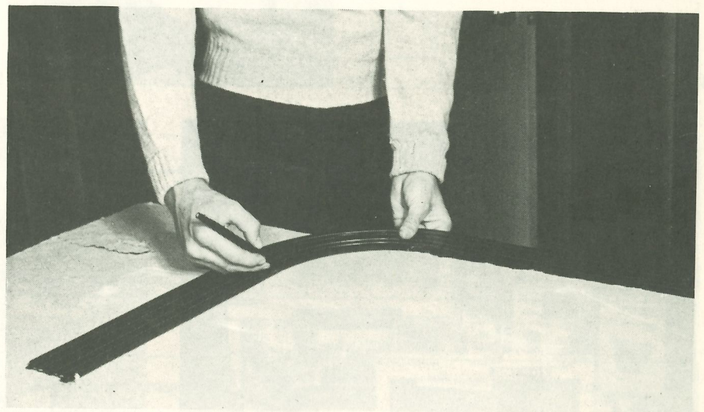

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15. Use staples to fasten the window-screen. Paper, cardboard, or wood blocks may be stuffed under the wire to support it. Don't nail down the track yet, since it must be removed before plastering. If you don't, you'll have the biggest mess you ever saw!

16. Any hobby plaster, wood-fiber mortar, or mountain-making material available in hobby shops can be used to cover the wire-screen mountains. This part is a lot of fun, something the whole family wants to join in doing!

17. Wallboard mountains are easy to make and avoid the wetness and mess of plaster. You just cut out profiles, stack them up, and shape them into hills, mountains, tunnels. Since they fit right against the track, you must trace the exact track section shape on the board so that, when you cut it out, it will be flush. Use a felt-tip pen.

Some tracks, such as Daytona, Pocono, Watkins Glen, and Riverside, have garage areas. The garages are light-duty buildings but offer a concrete floor, electricity for lighting and power tools, and workbenches. Mechanics often spend all night in these garages on last-minute tuneups or repairs, taking cat naps while waiting for a part to arrive from a nearby airport or for epoxy to harden. Scale-model garages can be constructed easily from cardboard or the corrugated sheet metal made for model railroad structures and sold in hobby shops.

Matchboxes, painted in bright colors and lettered with press-on type, become concession stands. Many HO buildings are available in kit form, including typical track structures and others which can be converted into unique raceway buildings. A huge variety of HO people can be purchased, either painted or unpainted, in almost every conceivable position—sitting, standing, working on cars, building structures, fishing, swimming, or ice-skating. More than 4000 different types are made, if you can locate a hobby shop or mail-order house that carries them.

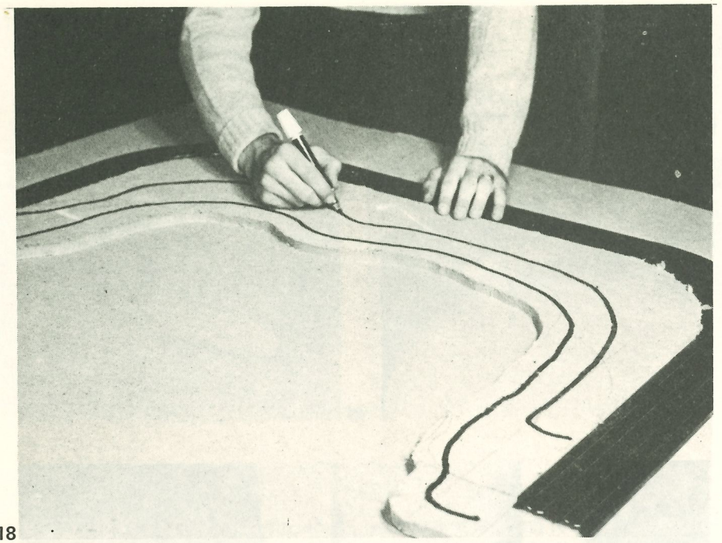
While the guard rails keep the cars on the track, spectator fences—such as chain-link fences made from aluminum screening and snow fences made from bamboo curtain material (as we'll explain shortly)—certainly add a lot of realism to your raceway.

The foregoing areas are part of every raceway and you should plan their locations, how much space you're going to give them, the roads needed to get from area to area, etc. Remember, wherever there are concentrations of people, put in plenty of ladies' and mens' rest rooms. These can be made from matchboxes. In fact, in the opinion of this writer, many of the real ones are!

Trees are made in all shapes, sizes, and types. Some are made of plastic, some of a soft, spongelike, green or multicolored material called 'lichen'. Trees are best placed in clusters, not just one here and one there. Don't put trees on the outside of a turn unless there's a guardrail in front, since trees near to turns or other hard-to-drive parts of a track are 'No-No's'.

You can make your own trees by purchasing lichen moss in a box and cementing clumps of it to tree-twigs, then drilling holes for them in the layout or cementing them in place. Lichen is also used for hedges, bushes, and other low foliage.

Guardrails are being used more and more at all race courses. The guardrails on the real tracks,



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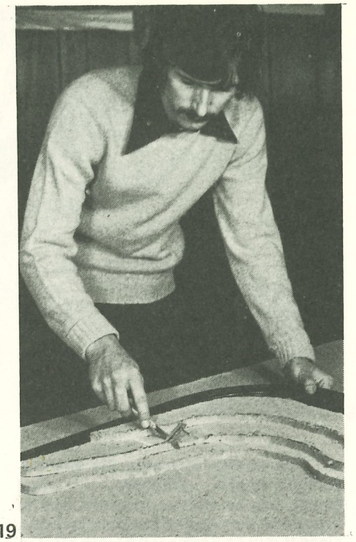

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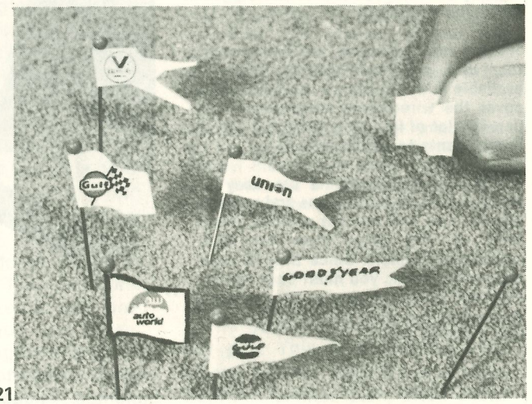

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however, aren't nearly as close as those fitted to the AFX track. Aurora knows this, but makes its track that way for the convenience of the 'in-between' racer and not the pro. You can go the full route by sinking the track into the wallboard as described earlier, then cutting in a two or three-inch shoulder at the side of the track and placing the guardrails at the outer edge. Note that guardrails contain the cars on the track to prevent injury to spectators; in many cases, they are very dangerous to drivers. For the latter reason, the rails have been moved well back from the road on some courses and a stopgap, makeshift crash-fence system has been developed to reduce the speed of an errant car before it hits the Armco barrier. Such fences are made from four-inch wooden posts (sometimes sawed part way through at ground level) and standard wire fencing which is inexpensive, expendable, and readily available. You might find a corner or two on your layout where you'd like to demonstrate this, using matchsticks and window-screen wire.

Many tracks use chain link fence to protect and contain the spectators. These enclosures are usually strung within 50 to 100 feet of the track or whatever distance is permitted by the insurance company or the club sanctioning the events. Copy chain link fencing by using strips of aluminum window-screen attached to nails hammered into the platform. Some tracks still use snow-fence, that rusty colored stick fence used to prevent snowdrifts along the highways. To model this, buy some bamboo window shade that's made up of hundreds of fine bamboo strips sewn together. Simply cut this to proper width and fasten it to small nails driven into the platform.

People, tents, trailers, campfires, a mud hole with muddy motorcycle riders (the 'Bog' at Watkins Glen) are all part of a race weekend, including 'racewatchers' rigs', a series of pipe supports and platforms put together for better observation. Such bits of 'local color' are fun to model; wood, paper, plastic, paints, and boxes of HO people you can paint will really allow you to customize your layout 'til it's like no one elses!

Flags and pennants can be made from paper and 'dyed' with colored pens. Just by folding the flag or pennant over a pin or thread (after coloring) and cementing with rubber cement, you can make hundreds of original flags in a jiffy.

The great variety of direction and advertising signs found at every track can be made up using decals and press-on type, advertisements clipped from magazines, and thin wood or card. Some courses use markers to assist the drivers in judging the distance to an up-coming turn. These are marked off in 50 or 100-yard intervals (4-3-2-1) to show the driver where he is and identify his braking and downshift points.

Since some races are run in the dark (such as the 12 hours at Sebring or the 24 hours at Daytona and LeMans), lights in the pit area, garage area, and timing towers are worth considering if you plan on holding events of this type. Many lighting systems have been developed for model railroads that you can use, or you can develop your own. One of the most versatile miniature lamps is the 18-volt 'grain of wheat' bulb. These can be used 'as is', or strung through 1/8-inch aluminum or brass tubing (or even drinking straws!). Wiring is simple: Just connect the bulbs in parallel to a separate power source, such as an inexpensive doorbell transformer.

Racing model cars with lights is fun and the AFX 'Flamethrowers' are the best. The only problem with these cars is that when you shut the power off, the lights go out. It's tough to race in the dark without lights! You can install lights on those turns to permit you to see the cars in the dark, but remember that few race courses have lights all the way around. Generally, lights are installed only in the pit area and at the start/finish line for timing and scoring.

18. After laying out your first piece, draw the contour you want to maintain. You must stack up as many thicknesses of wallboard as the height of the blocked-up track requires.

19. When the pile of wallboard reaches track level, shape it with a sharp knife. If you want this to be a smooth, grass-covered hill, sand it with a rough sandpaper. For sharp, jagged cliffs, break the wallboard over the edge of a table using a hammer. This material can be cut easily with any hand, keyhole, or coping saw. Cement it together with white glue.

20. Trees, hedges, shrubs, grass, gravel, earth, stones, people, flat spray paints, and many other decorative materials are available in hobby departments that cater to model railroaders. The best time to find these items is in Fall, when decorating train layouts is popular.

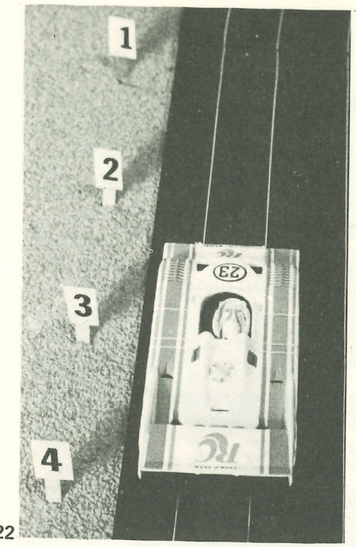
21. You can make hundreds of flags, pennants, and signs for your race course with paper, pins, rubber cement, felt-tip pens, and racing decals. Just decorate the paper, cut it to shape, apply rubber cement, and fold over thread or pins.

22. These are corner markers as seen on some tracks. They identify shifting and braking points and 'count down' (4-3-2-1) with the "1" being nearest the turn. Apply decal numbers to paper, then cement the marker to toothpicks and fasten to your track shoulder. They're arranged close together here for photo purposes only: Set them farther apart for realistic positioning.

23. Lights are easy to make and wire up. Purchase 'grain of wheat' bulbs rated at 14 to 18 volts and thread their lead wires through 1/8-inch aluminum tubing (or even small soda straws). Connect these lamps in parallel, using two main feeders with one lead from each bulb attached to one feeder, the other lead to the second feeder as shown in the wiring diagram. A separate powerpack should be used for the lights, to avoid 'robbing' power from your track.

24. 'Sinking' the track requires cutting the wallboard to suit your layout, shaping it to track level. Wallboard is easy to shape with a knife and sandpaper; when finished, it looks like sand.

25. This shows how a real race course might look, with its road surface, chain-link 'catch fence', guard rails, and spectator fences.



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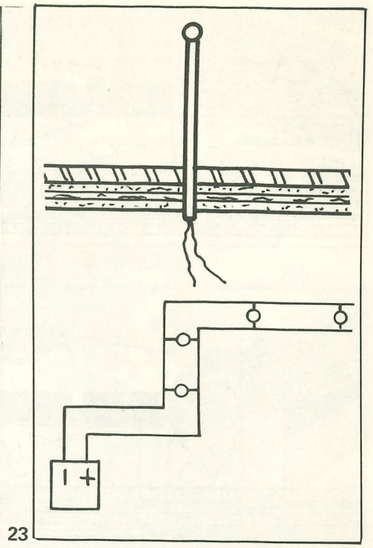

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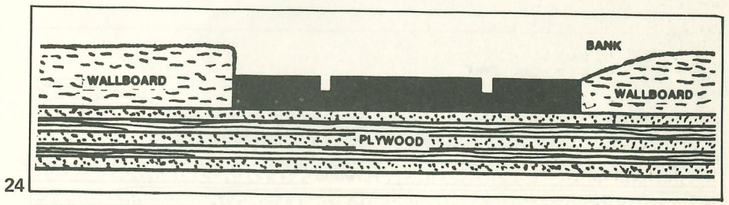

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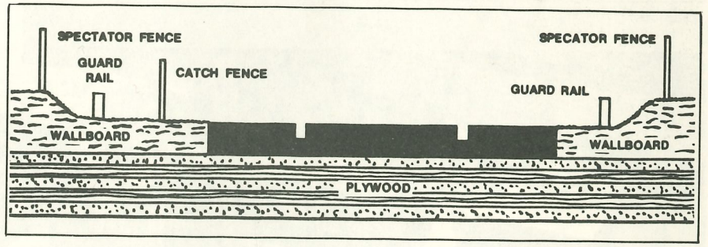

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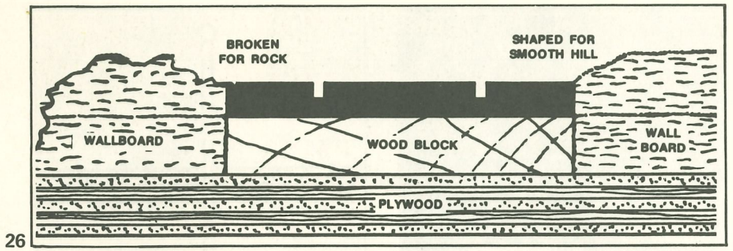

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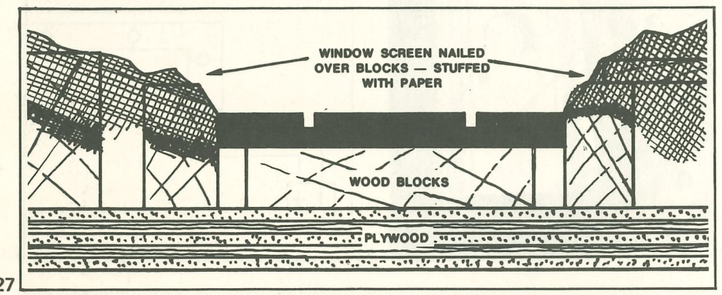
26. When using wallboard for landscaping, wood blocks should be cut to track width. The wallboard then stacks up against the track, as shown here. This material can be shaped and sanded to form smooth hills, or broken with a hammer to make rock formations. Painted and detailed, it looks very realistic.



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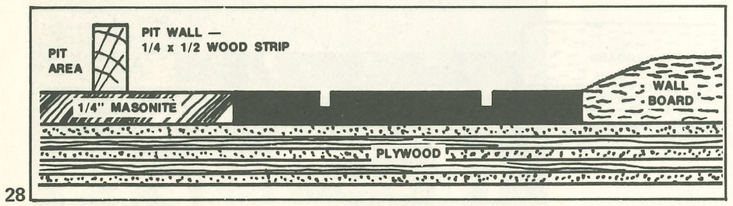
27. For screen-and-plaster landscaping, wider wood blocks are used to support the track. Strips of wood are attached to the blocks adjacent to the track, to provide a tacking point for the screening. Aluminum window screen filled with crumpled paper or formations of wood blocks is stapled to strips and platform to form a foundation for the plaster.



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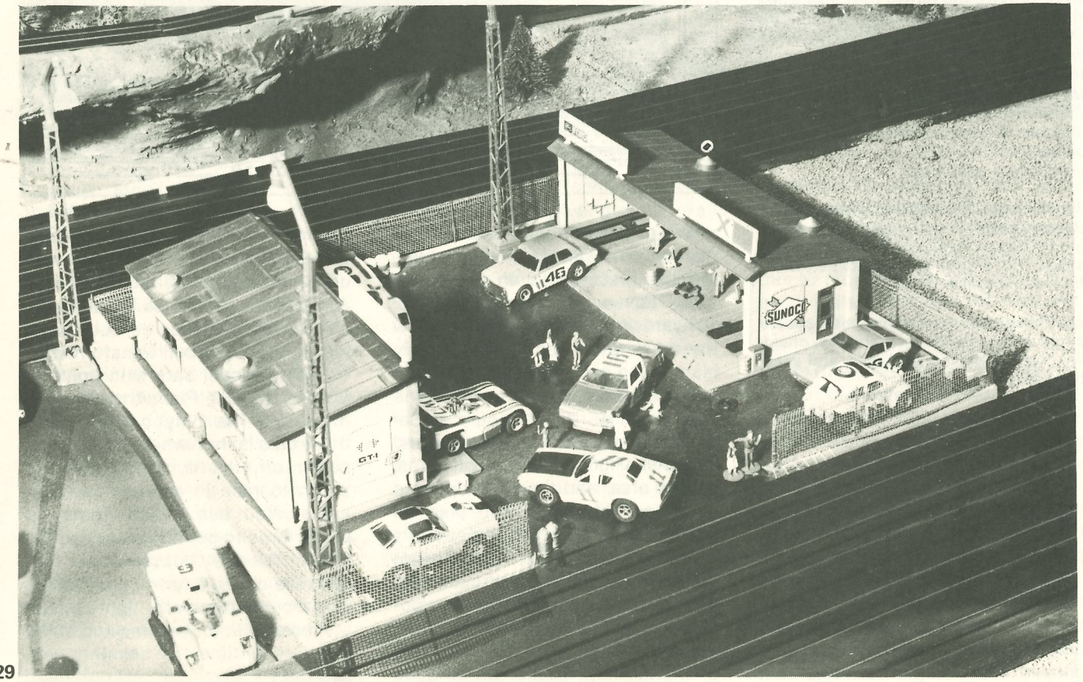
28. The smooth surface of the pit area is easily simulated with 1/4-inch Masonite. This material is the same thickness as the track and may readily be cut with an electric jig saw.

29. A finished pit area, using Aurora's No. 1453 dual pit stops, might look like this. You may sometimes be short on space, like the designer was on this layout. Note the chain-link fence (window screen), lights, HO train accessories, and people to suggest activity.



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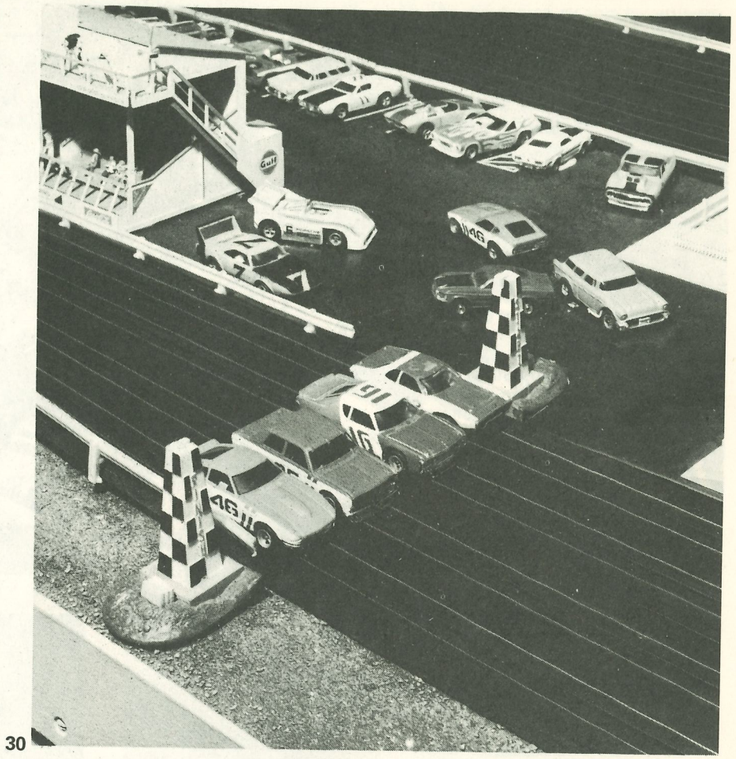
You may want to try a new method for lighting your track. Now that 'black light' bulbs are available with screw-in bases, you can flood your track with several of these. You'll have to purchase some of the paint that glows under black light and use it to paint the pits and guardrails, thus outlining the track with a ribbon of glowing brilliance. You must also paint the meatballs, headlights, and taillights of the cars. You'll be amazed at how clearly you can see the cars zipping around the whole track, and how easy it is to drive using this system.

Missing from all this exciting, realistic action are the sounds of real racing, but that's easily remedied. Stereo records of famous races are available, or you can capture racing sounds with a small tape recorder at any track and play them back throughout your layout by hiding speakers behind a mountain or under the platform with screens over them and fields of brush made from lichen moss to hide them from sight.

Capturing all the details of a real race course is difficult, and it's downright impossible to list them or tell you how to make them all in this chapter. We don't know and couldn't possibly know all the tricks, but there's one more detail you should work out.

Race safety vehicles are always placed strategically around the course, especially at the turns where the highest risk of accidents occurs. The number of wreckers, fire engines, or ambulances depends on the length of the track, and the number of cars and spectators at the event. At major races, helicopters are available and at least one medical building is used to provide immediate care to the sick and injured.

A road racing course is a complex plant, a facility where factory races against factory, team against team, and driver against driver. Spectators may travel as much as a thousand miles or more to attend. You can duplicate all of this in miniature in your own home. All that's required is a little imagination, a little ingenuity, and a few hours of pleasant, creative work.



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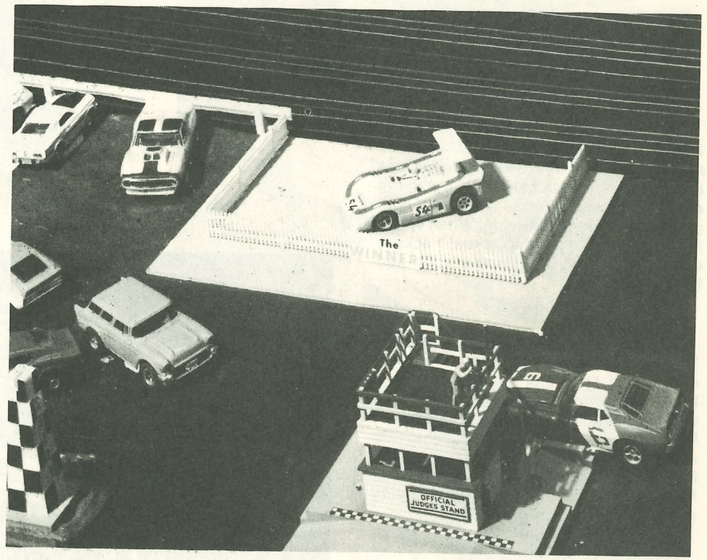

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30. The start/finish line can be demarked with No. 1450 pylons. The No. 1452 grandstand, guard rail, HO fence, people, and decal signs will add interest to your layout.

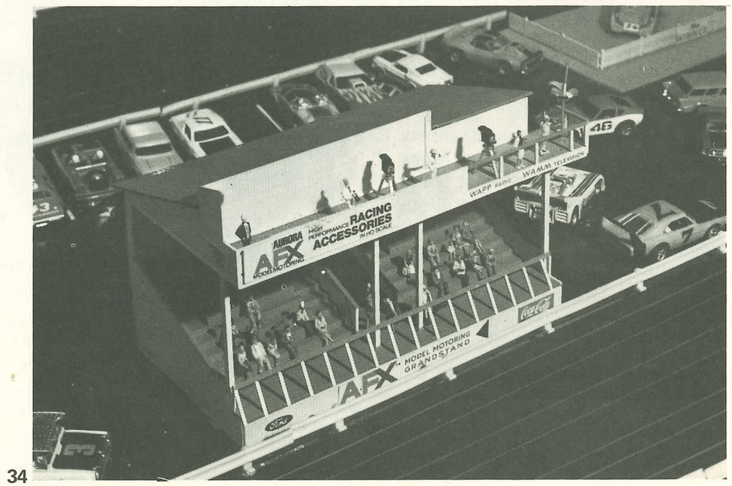
31. You can make a "winner's circle" using fencing and a piece of cardboard. Place it near the officials' or judges' stand (Aurora No. 1451) in the paddock area near the pits. The winner's car is pulled into this area for champagne, photos, and interviews with the press.

32

33

32. This four-lane banked turn was assembled from the No. 2545 Daytona and No. 2467 Monza bankings. A parking area was placed inside the loop with grandstands on the outside. When space is limited, infield parking at real tracks is usually reserved for competitors and their team-mates.

33. Curves are a good spot for grandstands and spectator vantage points in both speedway and road racing. This is where the action is, with the cars traveling slowly enough to give race-watchers a good look at the drivers at work. Extra-high ('Indy-type') chain link fence protects the spectators from possible flying debris.



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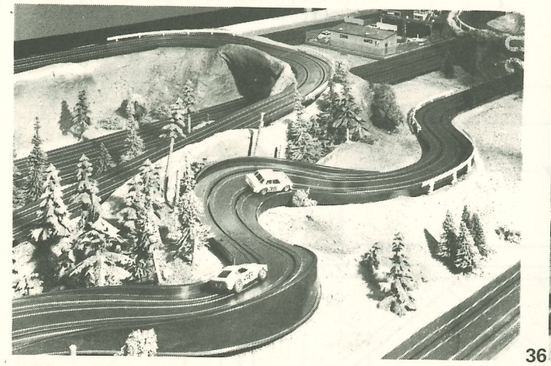
34. Covered grandstands may be placed side-by-side on the longer straightaways for more seating capacity. Radio, TV, and press people usually occupy the top deck of grandstands and other prime vantage points, a privilege they earn in exchange for race publicity and coverage.

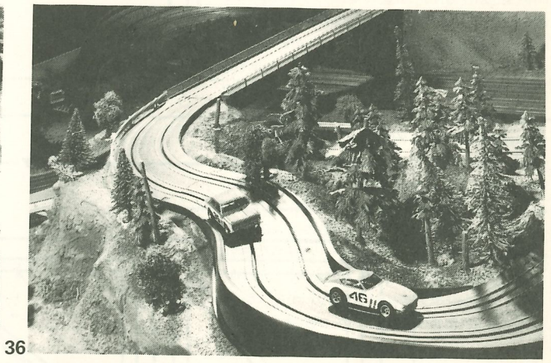
35

35. The mountains on this layout were constructed by the screen-and-plaster method. Actual rocks simulate boulders with trees, shrubs, and sand cemented in place using white glue diluted with water (plus a few drops of detergent to eliminate bubbling). The scenery was then painted with flat colors.

36. Beautiful scenes can be created easily with rocks, grass, paint and assorted trees. Aurora high-performance track is simple to use and versatile enough to fit almost anywhere—even inside a coffee table!

37. Here are the same scenes at night, under a Full Moon. Imagine racing in the dark at courses such as LeMans, Daytona, Sebring! You can create almost any scene: It's up to you to use your imagination and skill.





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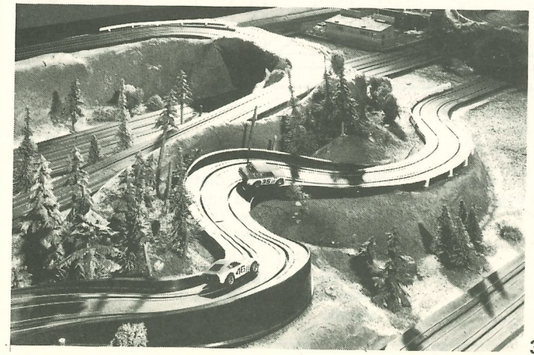

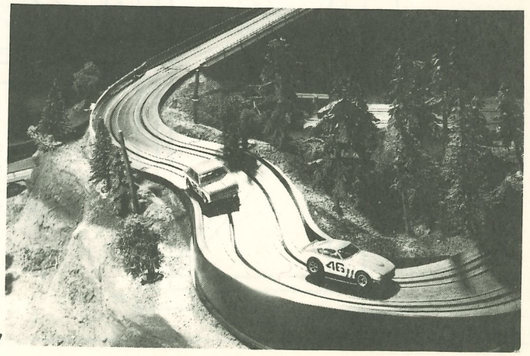

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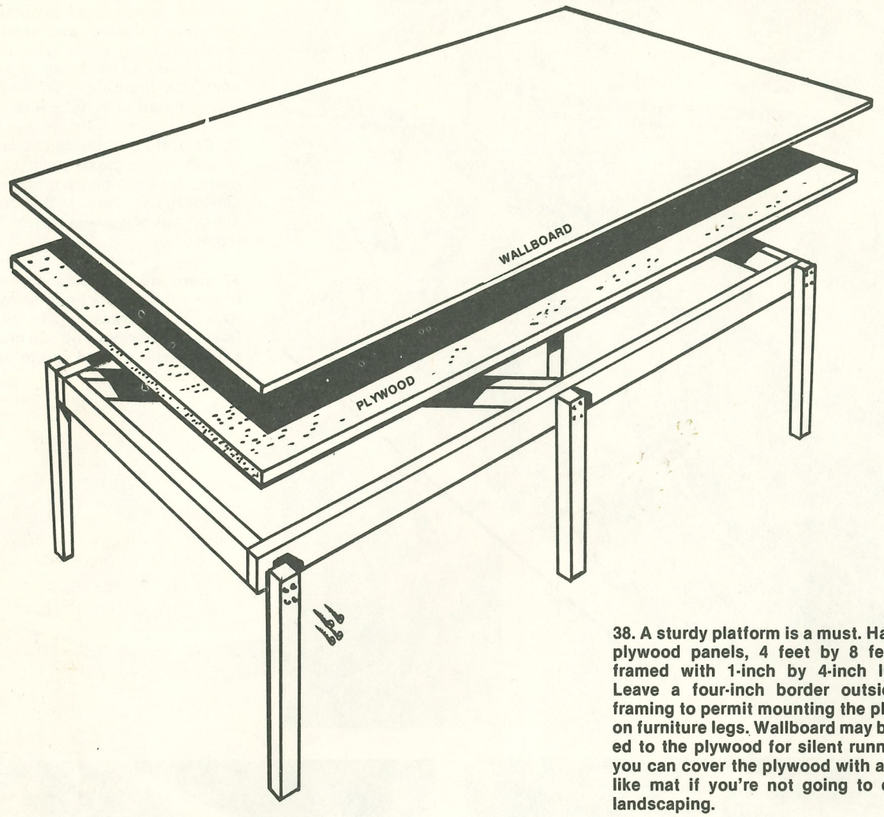

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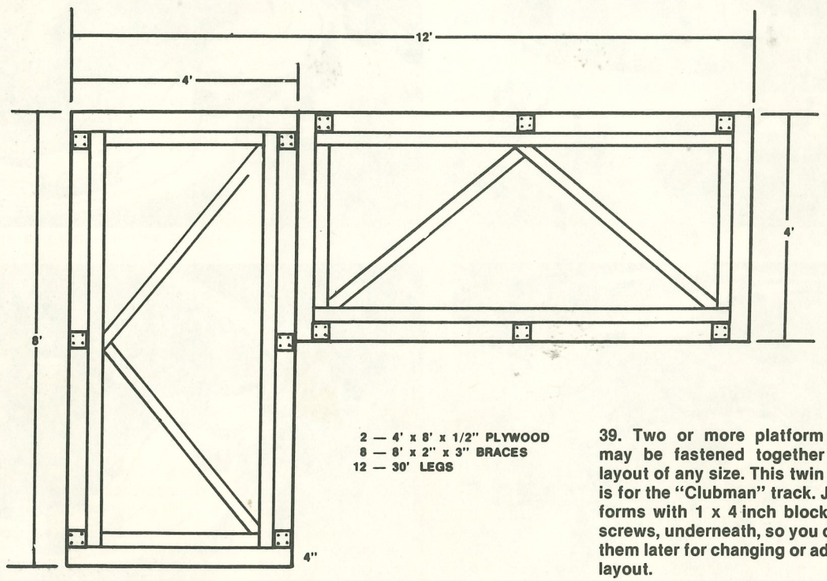
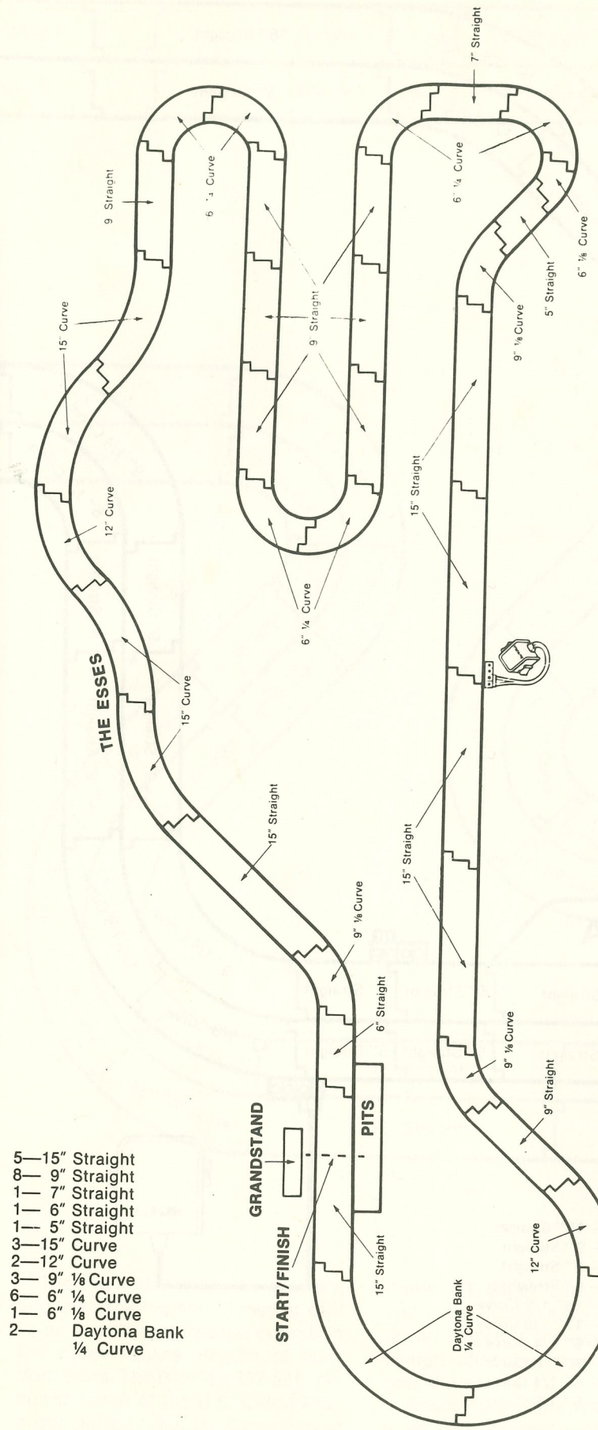
38. A sturdy platform is a must. Half-inch plywood panels, 4 feet by 8 feet, are framed with 1-inch by 4-inch lumber. Leave a four-inch border outside the framing to permit mounting the platform on furniture legs. Wallboard may be tacked to the plywood for silent running, or you can cover the plywood with a grass-like mat if you're not going to do any landscaping.



2 — 4' x 8' x 1/2" PLYWOOD
8 — 8' x 2" x 3" BRACES
12 — 30' LEGS

39

39. Two or more platform assemblies may be fastened together to make a layout of any size. This twin 4 x 8 design is for the "Clubman" track. Join the platforms with 1 x 4 inch blocks and wood screws, underneath, so you can separate them later for changing or adding to your layout.



5—15" Straight
8— 9" Straight
1— 7" Straight
1— 6" Straight
1— 5" Straight
3—15" Curve
2—12" Curve
3— 9" ⅛ Curve
6— 6" ¼ Curve
1— 6" ⅛ Curve
2— Daytona Bank ¼ Curve

RIVERSIDE INTERNATIONAL RACEWAY

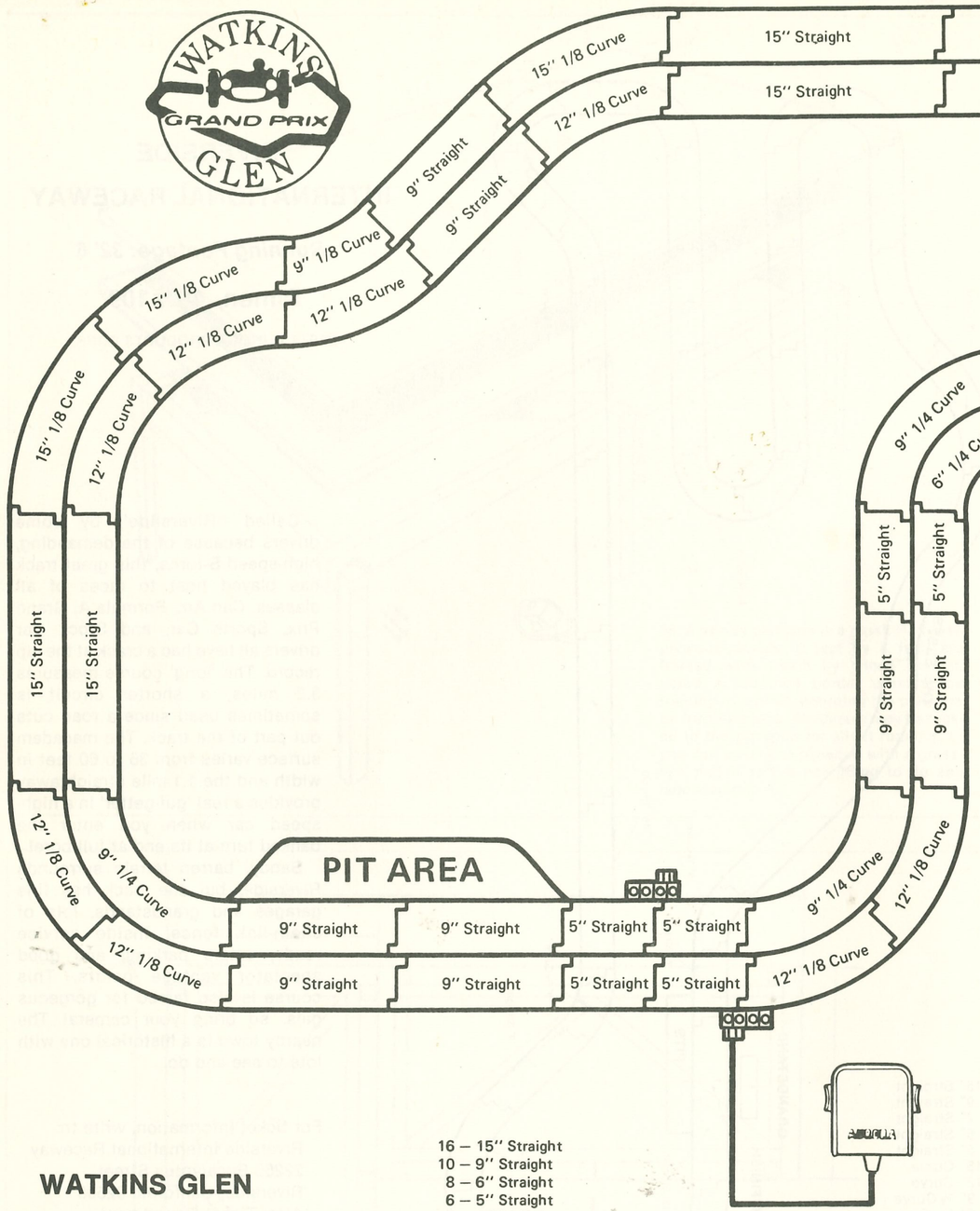
Running Footage: 32' 6"

Dimen. 48"x109"

Called "Riverslide" by some drivers because of the demanding, high-speed S-turns, this great track has played host to races of all classes. Can Am, Formula A, Grand Prix, Sports Car, and Stock Car drivers all have had a crack at the lap record. The 'long' course measures 3.2 miles, a shorter circuit is sometimes used since a road cuts out part of the track. The macadam surface varies from 36 to 60 feet in width and the 1.1 mile straightaway provides a real 'gut-getter' in a high-speed car when you enter the banked turn at its end at full bore!

Sandy, barren terrain surrounds Riverside, but the track has fine garages and grandstands, lots of chain-link fence, inside service roads, ample parking, and good spectator vantage points. This course is also famed for gorgeous gals, so bring your camera! The nearby town is a historical one with lots to see and do.

For ticket information, write to:
Riverside International Raceway
22255 Eucalyptus Street
Riverside, California 92508
Attn: Ticket Department

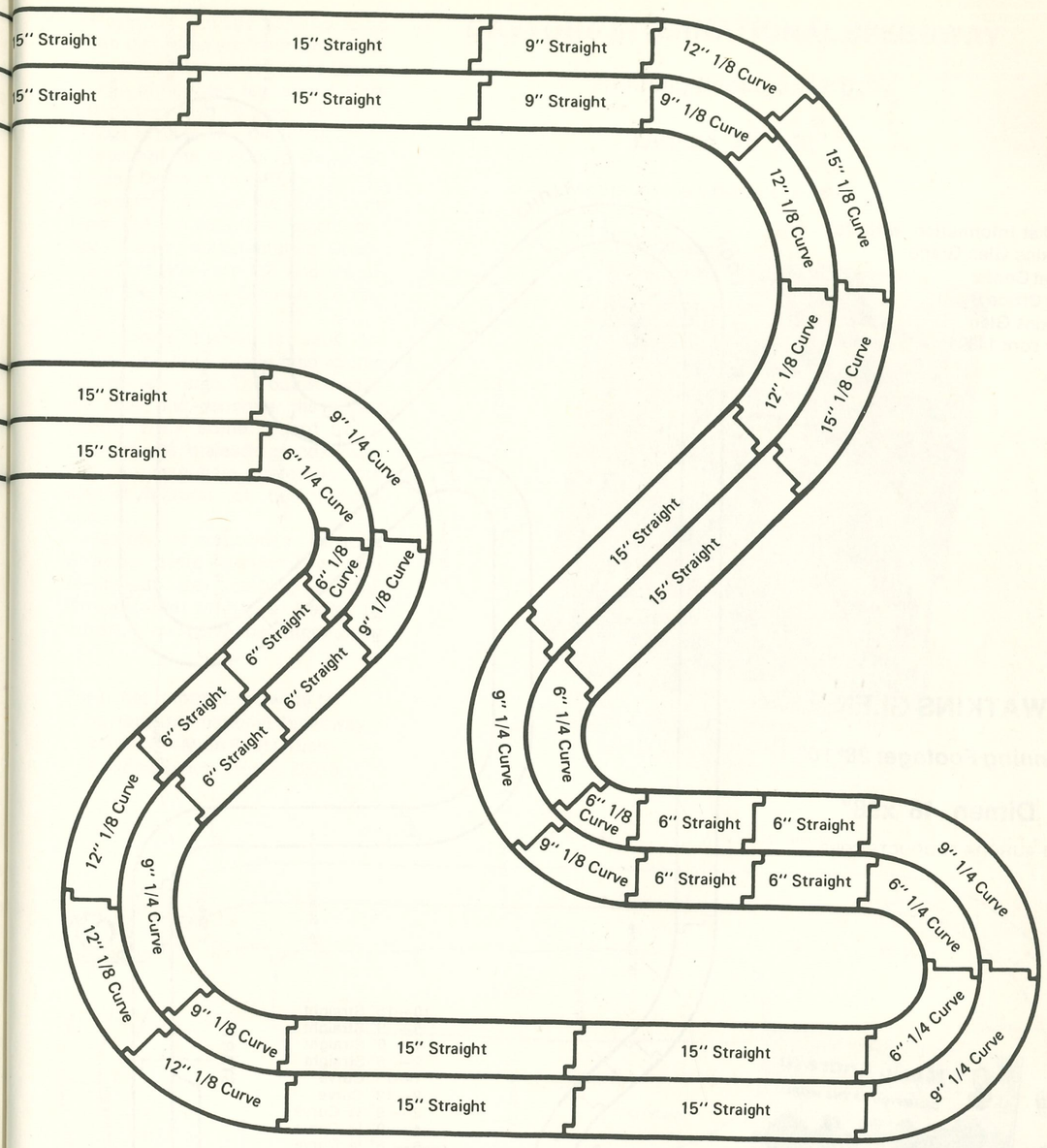


WATKINS GLEN

Running Footage: 33' 10"

Dimen. 110"x58"

16 — 15'' Straight
10 — 9'' Straight
8 — 6'' Straight
6 — 5'' Straight
5 — 15'' 1/8 Curve
14 — 12'' 1/8 Curve
8 — 9'' 1/4 Curve
5 — 9'' 1/8 Curve
5 — 6'' 1/4 Curve
2 — 6'' 1/8 Curve



The track, the town, the scenery, and the camping are all they're said to be at this picturesque course in the Finger Lakes Region of New York State. The Glen's 3.337-mile circuit is home of the U.S. Grand Prix every October, but its management probably has held more races than any other in the country. Grand Prix, Can Am, Trans Am, Formula A, Manufacturers' Championship, Camel GT, Stock Cars, Sports Cars, and even Midgets have run here. The layout shown is the newest; several design changes have taken place over the years.

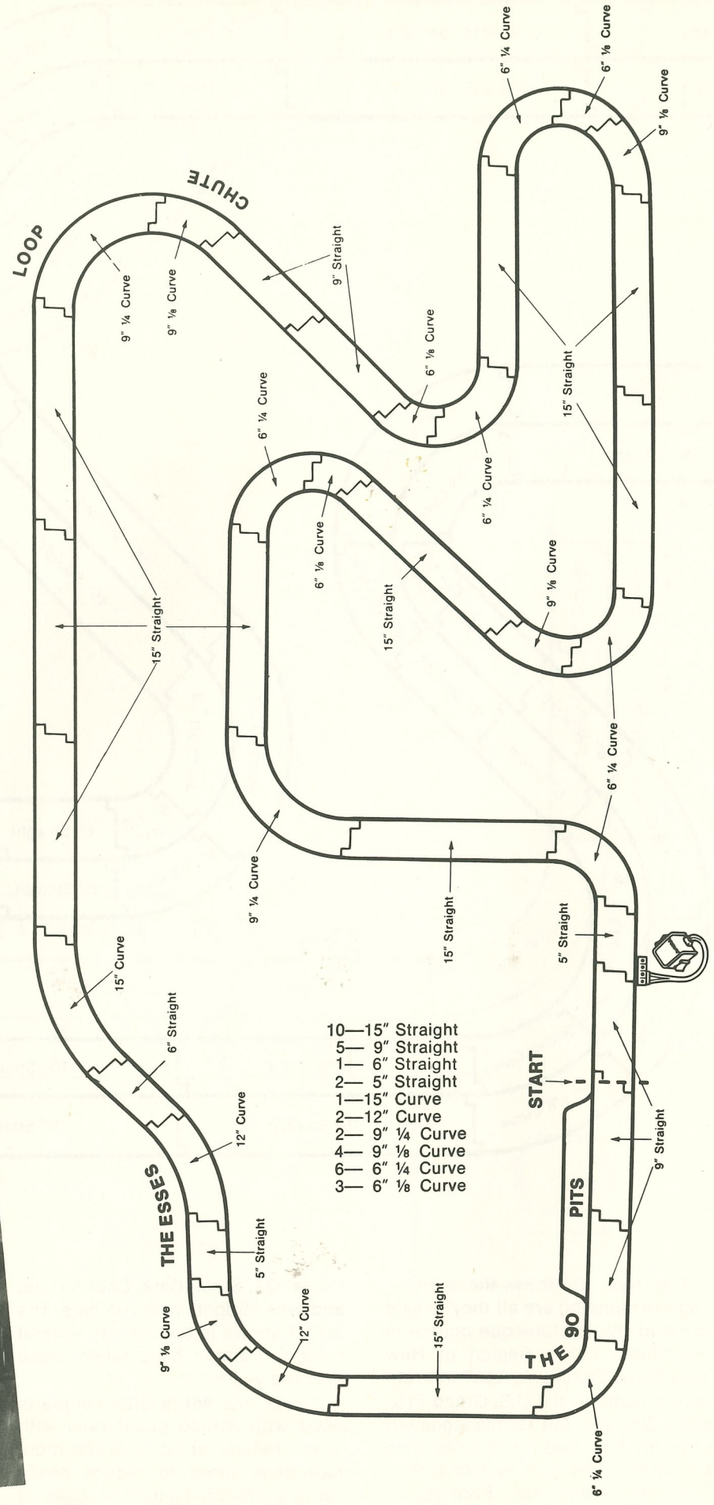
Almost the entire Glen course is lined with Armco guard rails with 'crash fences' at some of the more hazardous turns to reduce direct car-to-guard-rail contact in case of an incident. The grassy meadows, abundant trees, and gigantic infield attract camping spectators from all over the World. The new tech buildings, tower, grandstands, and covered pits with seats overhead are superb. Service roads are paved, miles of chain-link fence surround abundant spectator areas, and attendance is often more than 100,000 for a major event.

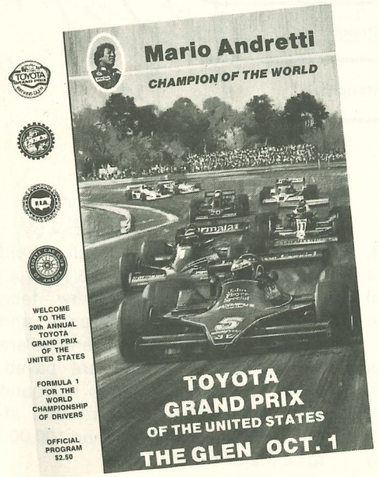
For ticket information, write to:
Watkins Glen Grand
Ticket Center
Post Office Box 1
Watkins Glen
New York 14891

WATKINS GLEN

Running Footage: 28' 10"

Dimen. 46"x98"





Daytona's famous banking is so steep that when you're driving in the groove it's hard to see more than a couple of hundred feet ahead. Cars hitting less than 70 mph have been known to slide into the infield!

Home of the 24-hour International Races, Daytona has been host to drivers from all over the World in all types of competition machinery. Sports cars, manufacturers Championships, Winston GT, and motorcycle events have been on the racing calendar.

Daytona's tri-oval is used for stock cars, the 3.8-mile road course for special events. The outside walls are steel and concrete, the infield sandy with some guard rails. Covered pits, majestic grandstands, and an excellent cafeteria are special features of this famous course.

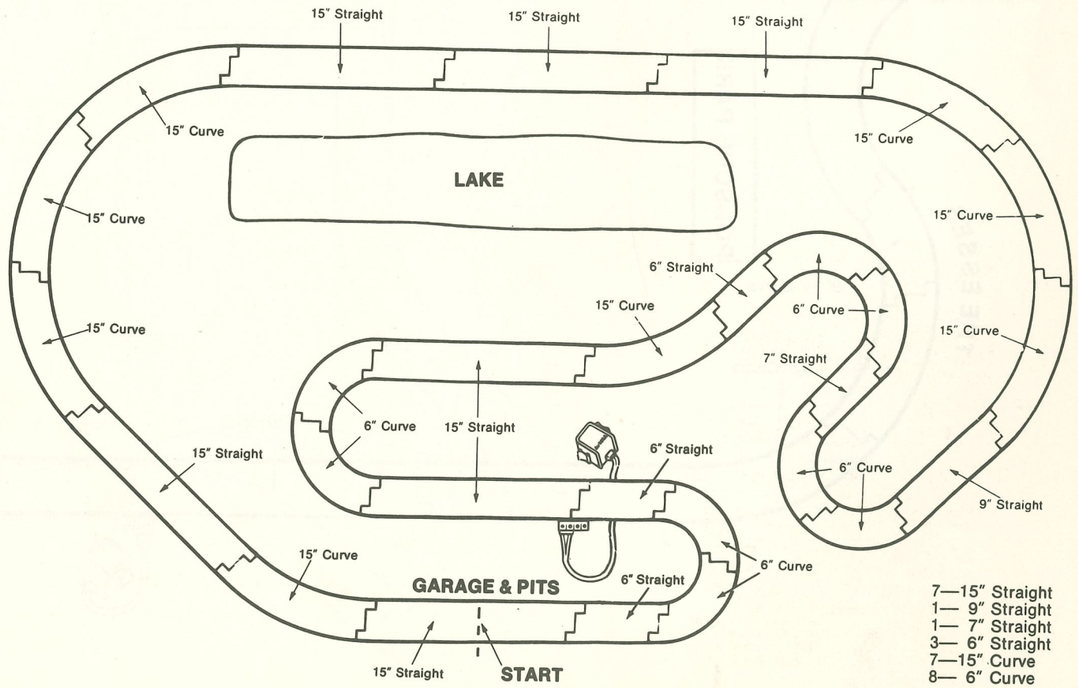
Nearby, at renowned Daytona Beach, good swimming and fishing—to say nothing of dining—provide off-hours treats to drivers, crews, and spectators alike.

For ticket information, write to:
Daytona International Speedway
Drawer S—Main Post Office
Daytona Beach, Florida 32015

DAYTONA INTERNATIONAL SPEEDWAY

Running Footage: 22' 0"

Dimen. 75"x40"



MOSPORT

Running Footage: 23' 1"

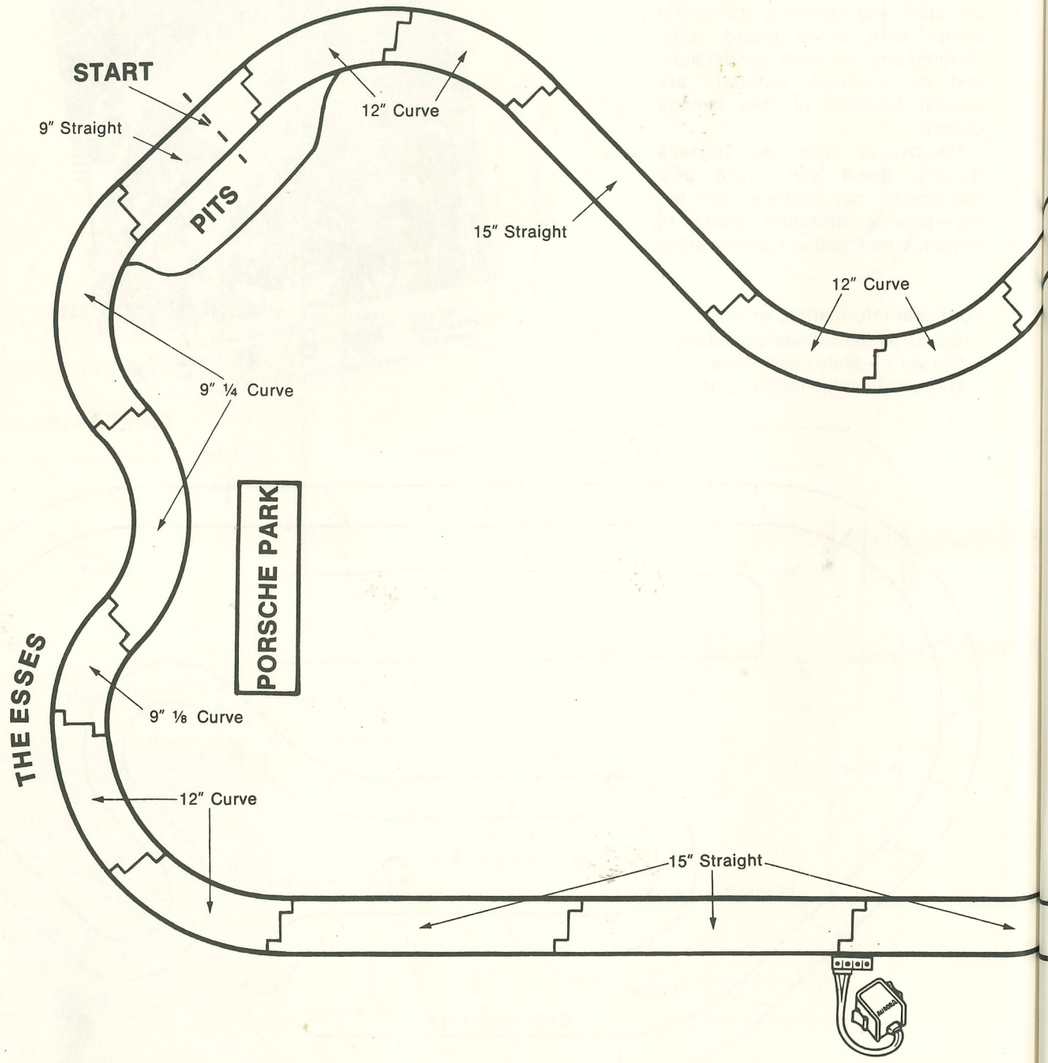
Dimen. 56"x87"

You've got to hang on going over the hill past the start-finish line, top another hill and hang on again, nip the apexes, then bend it thru' MOSS turn before you hit Mario Andretti straight for the high-speed run to the braking stretch for a right-hand sweeper. Even the uninitiated can see that this is super-exciting racing!

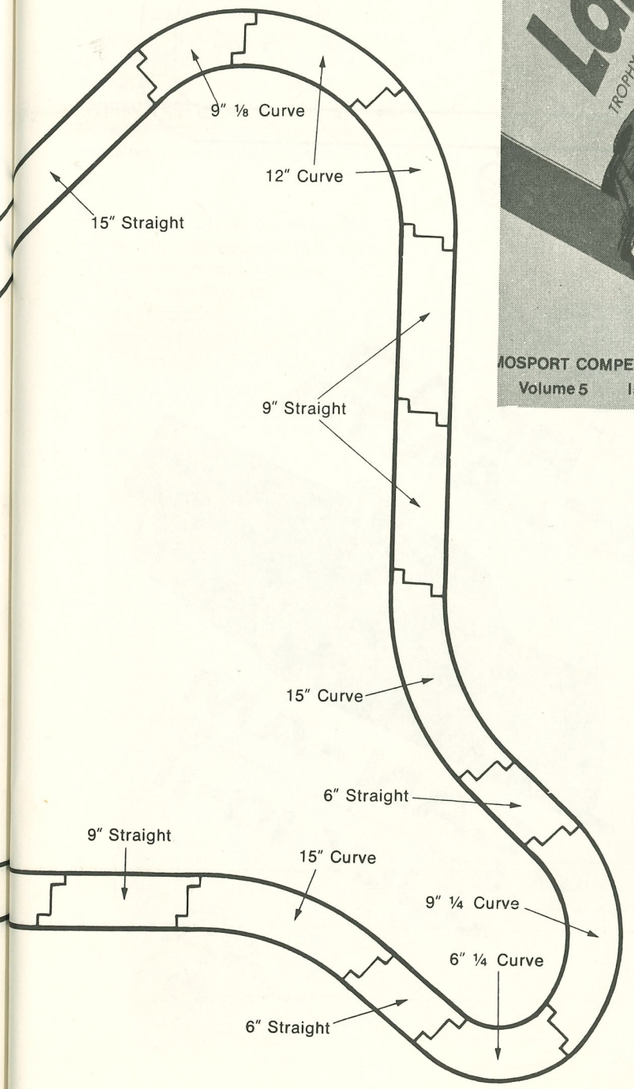
Mosport's 2.459-mile circuit winds thru' grassy hills, wooded areas, and earthen banks. Guard rails line some sections. It's a course that's seen Grand Prix drivers running in the Canadian GP, Can Am, and Trans Am. Sports car drivers as well as motorcyclists also use this north-of-the-border raceway.

'Moe Sport', the cartoon character you see in this track's ads, invites campers with a special weekend ticket and thousands always turn out. Complimentary firewood, plenty of water, and 'Under 12 free' are the themes of this hospitable fellow.

Covered pits, newly built garages, a fine operations tower, and a big paddock area make Mosport both a drivers' and spectators' course.



For ticket information, write to:
Mosport Park Ltd.
1905 Avenue Road
Toronto, Canada
Attn: Mosport Ticket Department

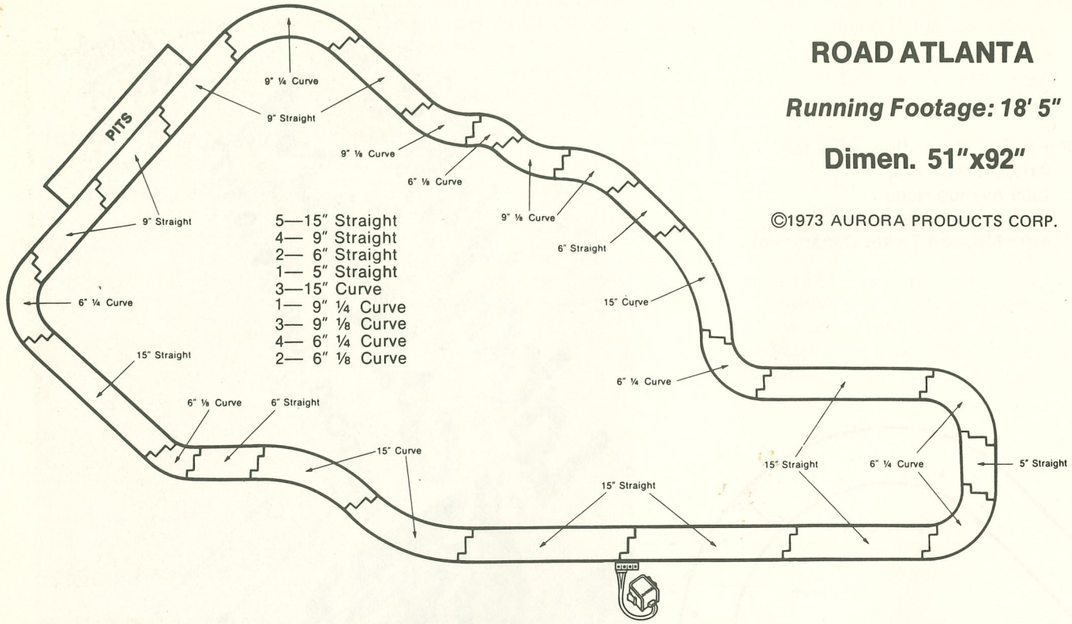


5—15" Straight
4— 9" Straight
2— 6" Straight
2—15" Curve
8—12" Curve
3— 9" ¼ Curve
2— 9" ⅛ Curve
1— 6" ¼ Curve

ROAD ATLANTA

Running Footage: 18' 5"

Dimen. 51"x92"



Carved out of red Georgia clay, Road Atlanta is a real drivers' challenge. The course runs uphill, downhill, thru' blind turns and a seemingly endless number of curves. Coming out from under the bridge for the last turn into the pit straight, you turn on the power and dive downhill like a P-51 Mustang.

While Can Am, Formula A, Trans Am, stock cars, and motorcycles have run this 2.52 mile circuit, the highlight of the year is SCCA's American Road Race of Champions held each Fall. More than 400 racing teams in seven divisions invade Road Atlanta to compete for the championship and the 21 titles at stake. It's a fabulous carnival of racing, and no spectator has ever gone home disappointed.

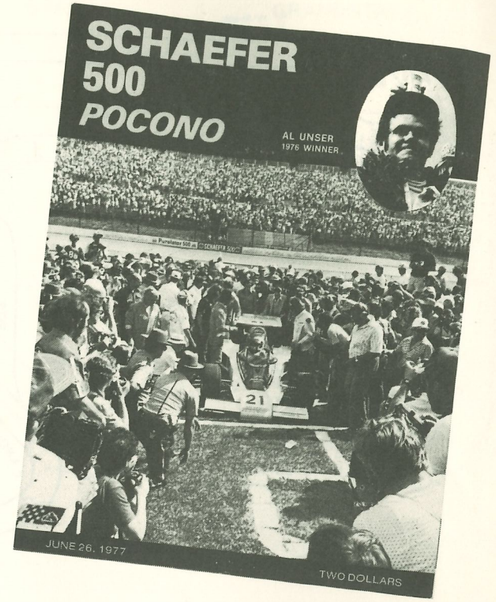
The red clay banks and shoulders, verdant fields, and plentiful trees make Road Atlanta's hills a campers' paradise. Chain-link fences demark plenty of fine spectator vantage points and some Armco guardrails help keep the cars on the track. A great operations tower and lots of restrooms add a touch of real professionalism to this course.

For ticket information, write to:
Road Atlanta
830 W. Peachtree St.
Suite 212
Atlanta, Georgia 30308
Attn: Ticket Department

Here's a switch! An 1100 acre tract of the flattest and fastest land in the whole Northeastern United States lies in the heart of Pennsylvania's famed Pocono Mountains. You can sit in the grandstand and watch the whole race, whether it's on the 2.5 mile tri-oval speedway, the 1.8 mile course, or the 2.3 mile road circuit. You can camp in the infield and watch Indy cars, Stock cars, Sports cars, Formula A, and even motorcycles, racing on any of the main courses. Or, you can watch Motocross on the infield circuit. There's a 3/4-mile oval, too, for Stockers, and Midgets.

Pocono's outside walls are steel and concrete, the infield circuit wrapped in Armco guard rails. The grassy infield is flat. Open pits, new garages, and plenty of chain-link-fenced enclosures are present developments in this constantly expanding racing enterprise.

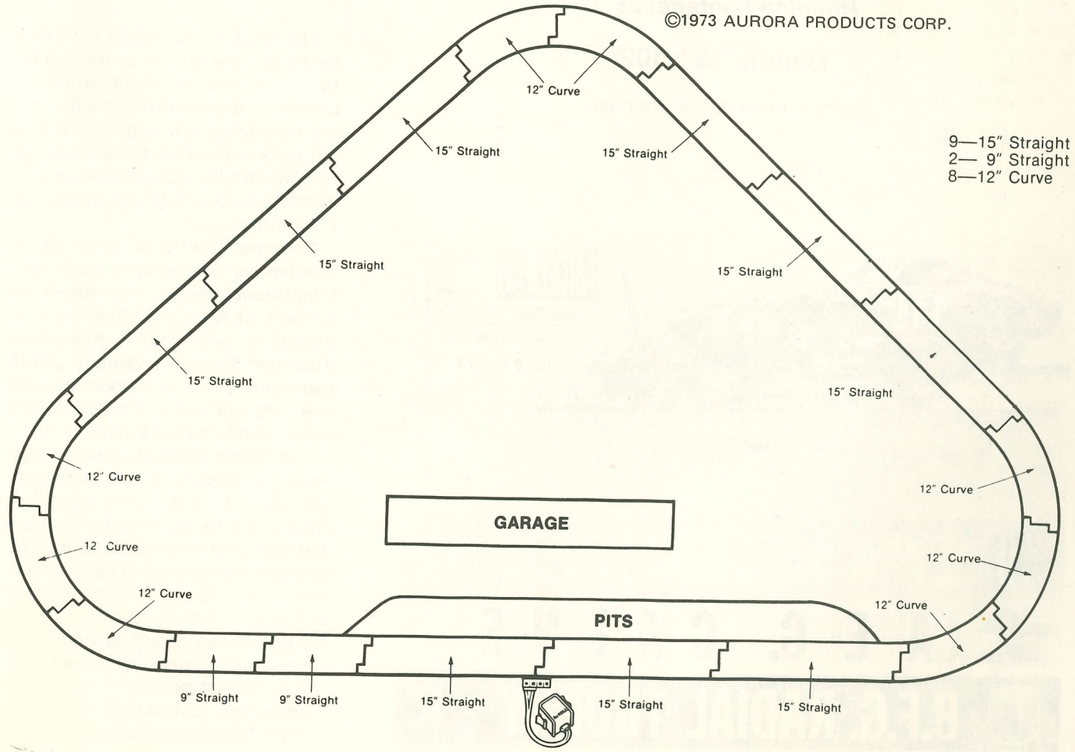
For ticket information, write to:
Pocono International Raceway
Ticket Information Center
Post Office Box 500
Mount Pocono
Pennsylvania 18344

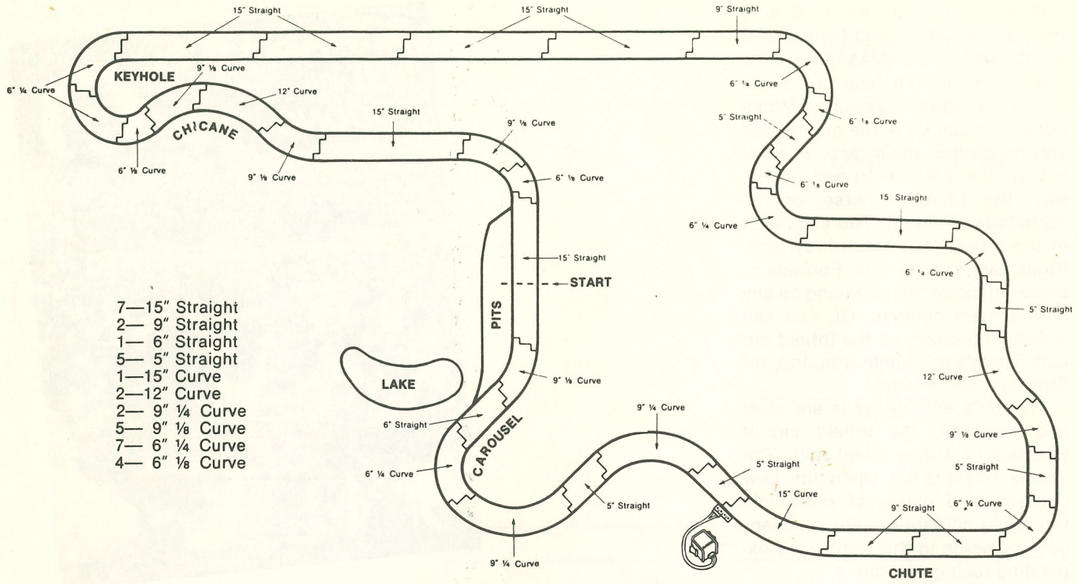


POCONO INTERNATIONAL RACEWAY

Running Footage: 18' 9"

Dimen. 50"x80"





7—15" Straight
2— 9" Straight
1— 6" Straight
5— 5" Straight
1—15" Curve
2—12" Curve
2— 9" 1/4 Curve
5— 9" 1/8 Curve
7— 6" 1/4 Curve
4— 6" 1/8 Curve

MID-OHIO SPORTS CAR COURSE

Running Footage: 26' 1"

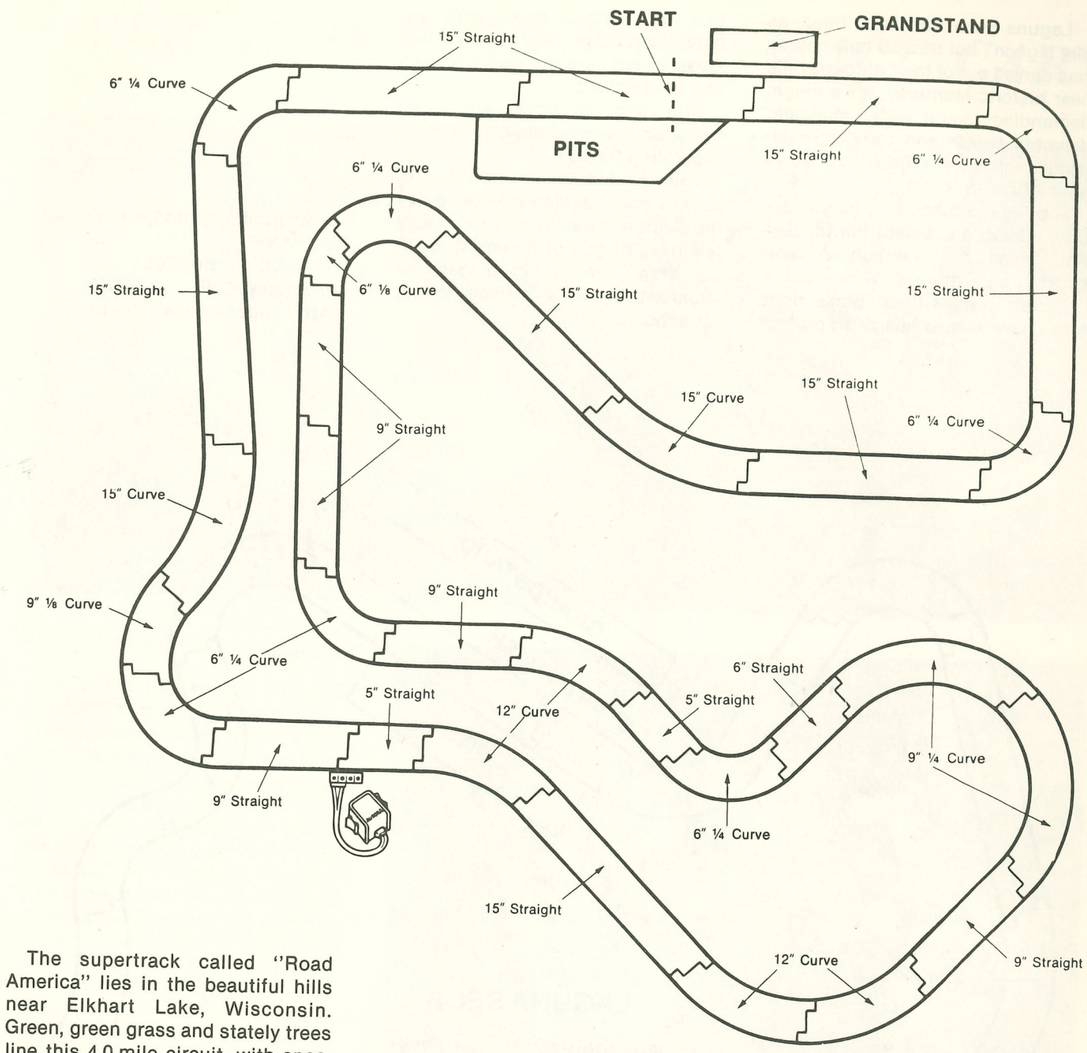
Dimen. 53"x102"

The Mid-Ohio course is a 2.4 mile twisting, hilly circuit in the grassy fields of the Buckeye State. A challenge to car and driver alike, racing here gives few opportunities to 'sit back and watch the scenery go by' whether it's Can Am, Trans Am, Formula A, Camel GT, or sports-car competition.

Overhead traffic bridges, chain-link fences, and service roads winding through the wooded infield are all part of Mid-Ohio. The track is macadam with some guard-rails. Abundant spectator vantage points make this a fine race-goers course. The pits are open, the operations tower sparse but adequate.

Mid-Ohio's paddock area is large: Paddock passes are available to spectators for a few extra bucks and provide a fine opportunity to meet and talk with the teams as well as 'eyeball' the cars close up.

For ticket information, write to:
Mid-Ohio Sports Car Course
P. O. Box 3008
Lexington, Ohio 44904
Attn: Ticket Information



The supertrack called "Road America" lies in the beautiful hills near Elkhart Lake, Wisconsin. Green, green grass and stately trees line this 4.0 mile circuit, with spectator areas on practically all the turns for watching the high-speed or low-speed action.

It's a great track to drive: You fly past forests, banks of sand, and limited stretches of guard-rail. There's a field or two at the end of several hairy straights, just in case you 'lose it'.

Road America features Can Am, Trans Am, Formula A, and Sports Car racing. Its gigantic paddock, covered pits, and acres of chain-link-fenced space give drivers, crews, and spectators plenty of freedom. The roasted corn and bratwurst available at the concession stands are great! Thousands of spectators camp nearby and enjoy swimming in the crystal-clear lake water.

ROAD AMERICA

Running Footage: 27' 8"

Dimen. 63"x60"

8—15" Straight
5— 9" Straight
1— 6" Straight
2— 5" Straight
2—15" Curve
4—12" Curve
2— 9" 1/4 Curve
1— 9" 1/8 Curve
7— 6" 1/4 Curve
1— 6" 1/8 Curve

For ticket information, write to:
Road America Ticket Center
Elkhart Lake
Wisconsin 53020

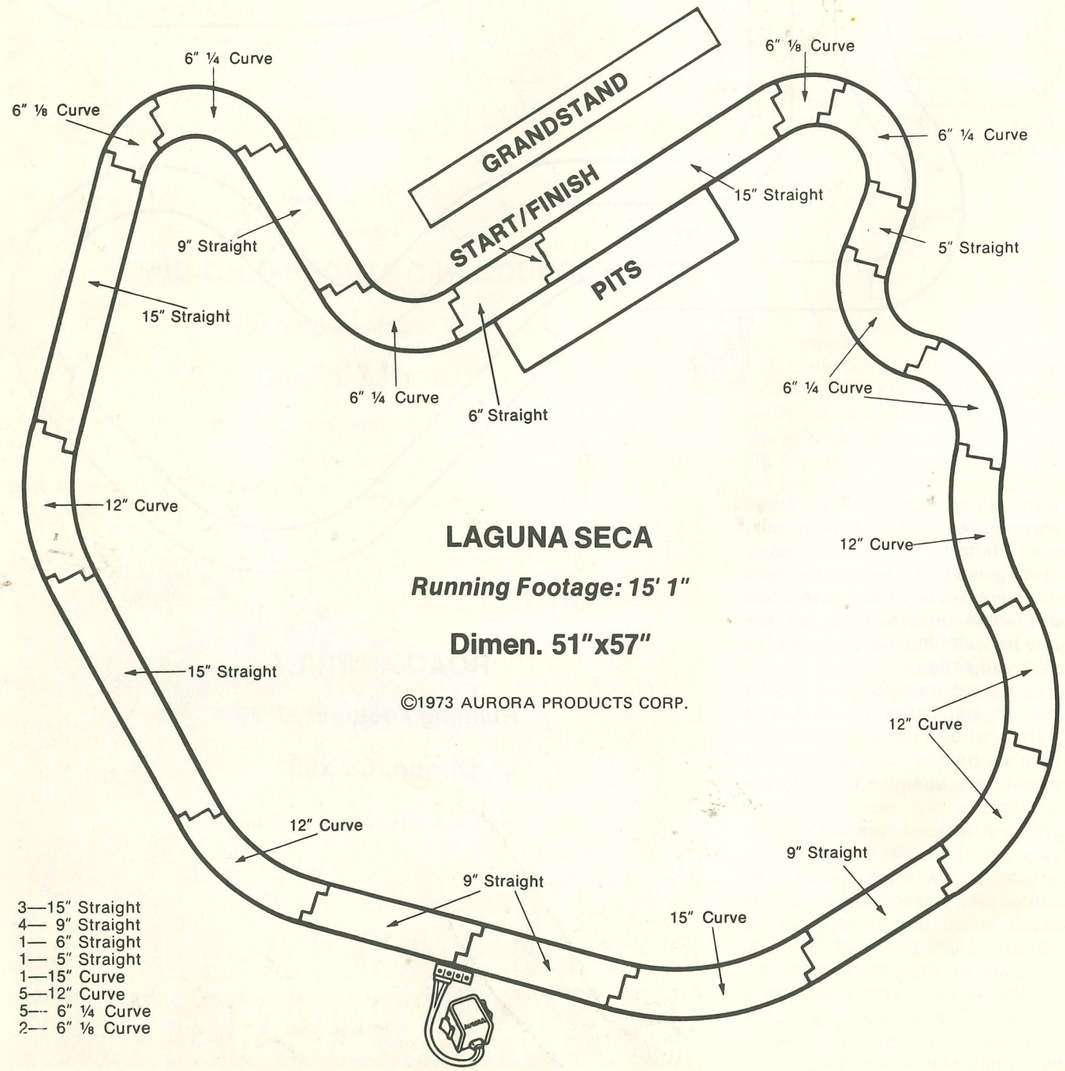
Laguna Seca translates freely as 'dry lagoon', but this 1.9 mile course was carved out of the California hills near historic Monterey. It's a tough, demanding circuit with uphill and downhill twists and turns through sandy soil contrasting with stretches of green forest.

A bridge crosses one uphill section, adding a special thrill for Can Am, Trans Am, Formula A, and sports car drivers who tackle Laguna's competitions. Some tight turns have Armco guard-rail protection for spectator areas, with haybales dropped on race day in certain areas where cars are prone to spin and tap the rails.

Pits and paddock are open macadam, with chain-link fencing separating them.

This course is a favorite with drivers and spectators who enjoy the California sunshine, as well as a few days of golf or fishing while in the area. The dining places are superb, the marina a prime tourist attraction.

For ticket information, write to:
SCRAMP
Post Office Box 2078
Monterey, California 93940
Attn: Laguna Seca Tickets



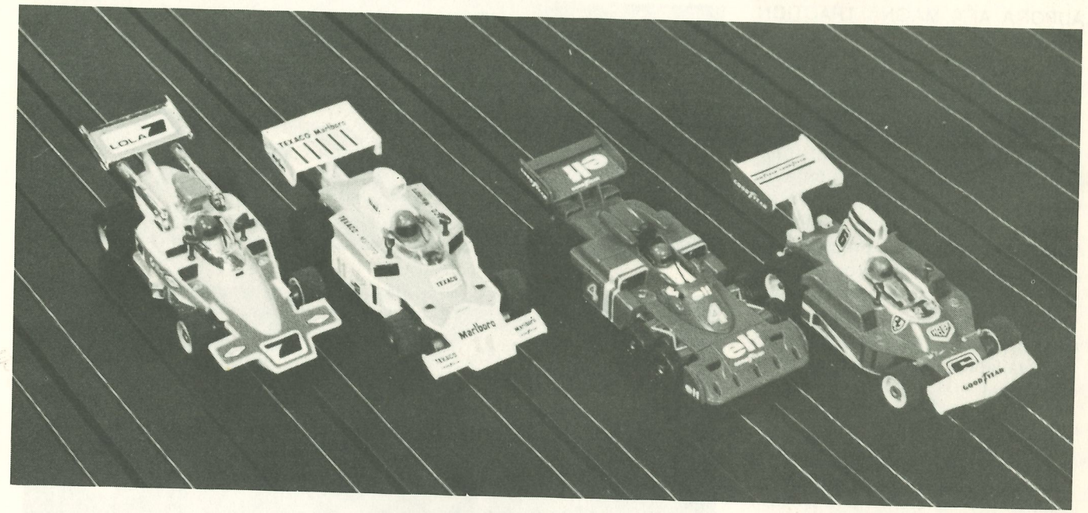
LAGUNA SECA

Running Footage: 15' 1"

Dimen. 51"x57"

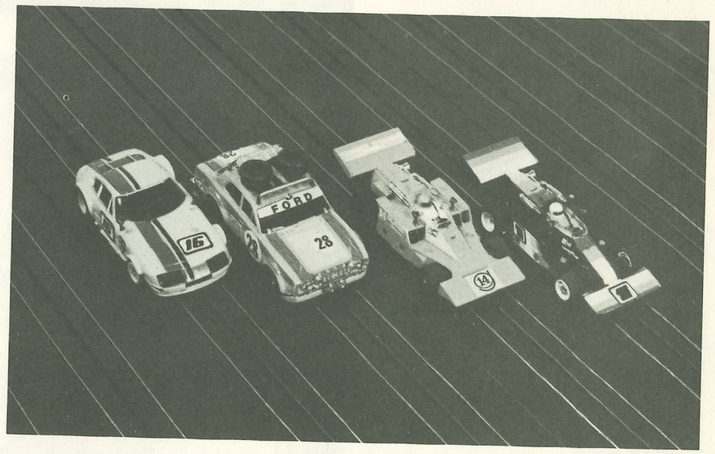
3—15" Straight
4— 9" Straight
1— 6" Straight
1— 5" Straight
1—15" Curve
5—12" Curve
5— 6" ¼ Curve
2— 6" ⅛ Curve

OVER 40 POCKET-SIZED RACE CARS



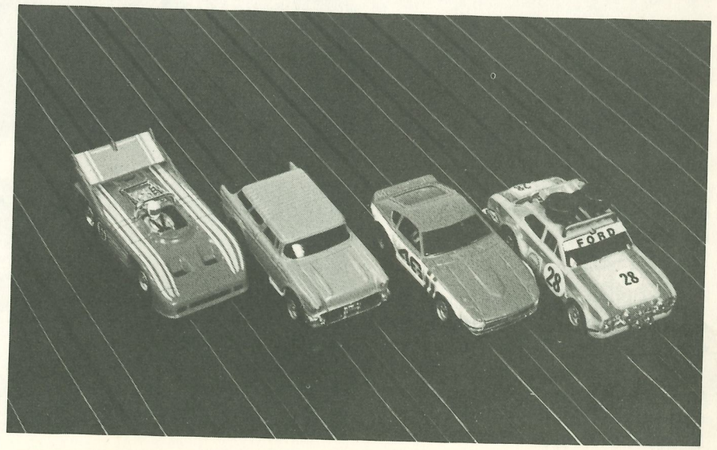
AURORA AFX G-PLUS CARS

For out and out racing, the world record holding G-Plus cars are hard to beat, even by scratch built supercars. The narrow, low inline chassis with lowered magnets gives it the kind of handling you want in a race car. The tiny, powerful high revving armature is a product of many years of testing and refinement. Practically blow proof, even after hundreds of hours of hard racing. To get maximum performance from your G-Plus car, super tuning is a must. Also, because of its ground hugging rail ripping performance, you'll have to make sure that the track rails don't exceed .015" in height or the car may 'stick' on the track (because of its magnetic pull). G-Plus is the powerhouse race car you can put in your pocket.



AURORA AFX SUPER MAGNA TRACTION CARS

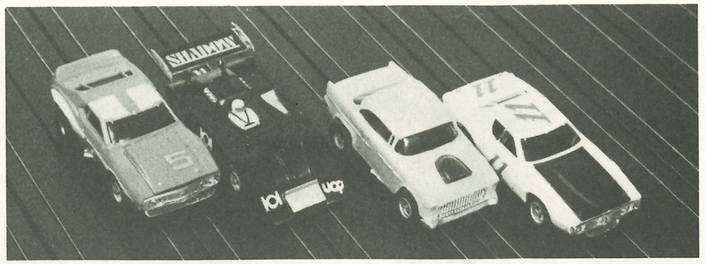
A lower cost, modified version of the G-Plus car. Using the same basic layout, the AFX Super Magna Traction car has a slimline chassis that can be used with open wheel bodies. Some of the G-Plus parts can be interchanged like the guide shoes and armature. These will increase performance. As recommended for G-Plus cars, rail heights on the track should not exceed .015" in height for best performance.

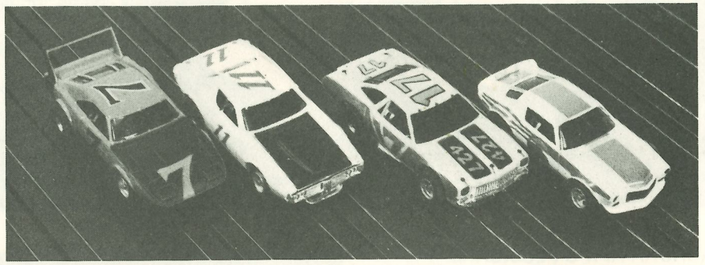


AURORA AFX CAR COLLECTION

AURORA AFX MAGNA TRACTION CARS

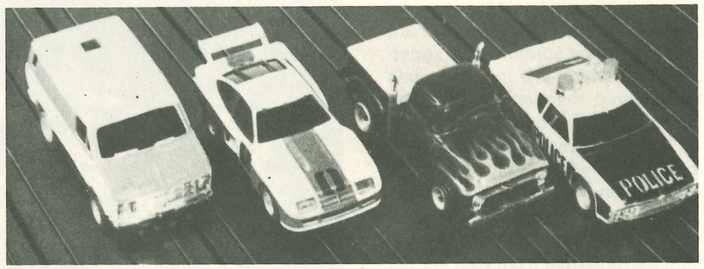
The most popular AFX cars of all time. Lowered magnets provide track gripping action making them easy to drive and less prone to deslot. The 'pancake' design chassis is a well proven design, the high RPM horizontal precision armature is easy to control and provides smooth power for smooth high speed driving. They are fun to drive and fun to race. The vast body selection available is sure to please every enthusiast.

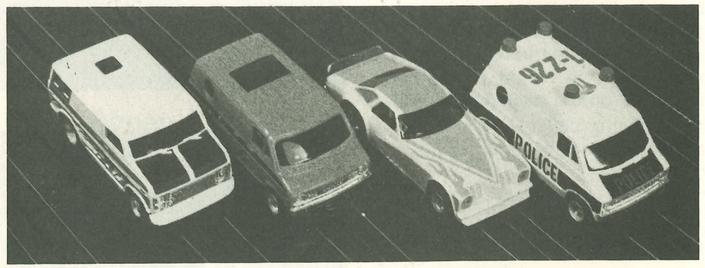




AURORA AFX MAGNA SONIC CARS

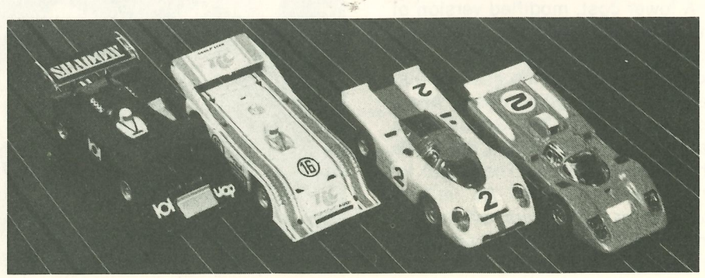
These cars feature the famous AFX Magna Traction 'pancake' chassis, and have a 'sound box' fitted to produce an engine type sound as the car races around the track. These cars are not available in all body styles, and the sound boxes are fitted to each car so bodies are not really interchangeable. The sound unit can be removed and gear clamp No. 8608 used to convert the car to a standard type AFX Magna Traction car.



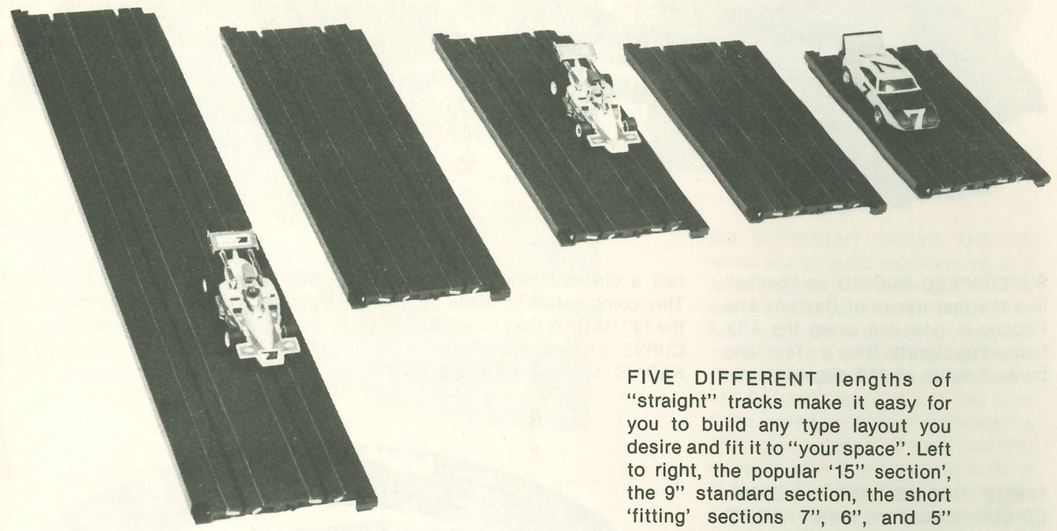


AURORA AFX FLAMETHROWER LIGHTED CARS

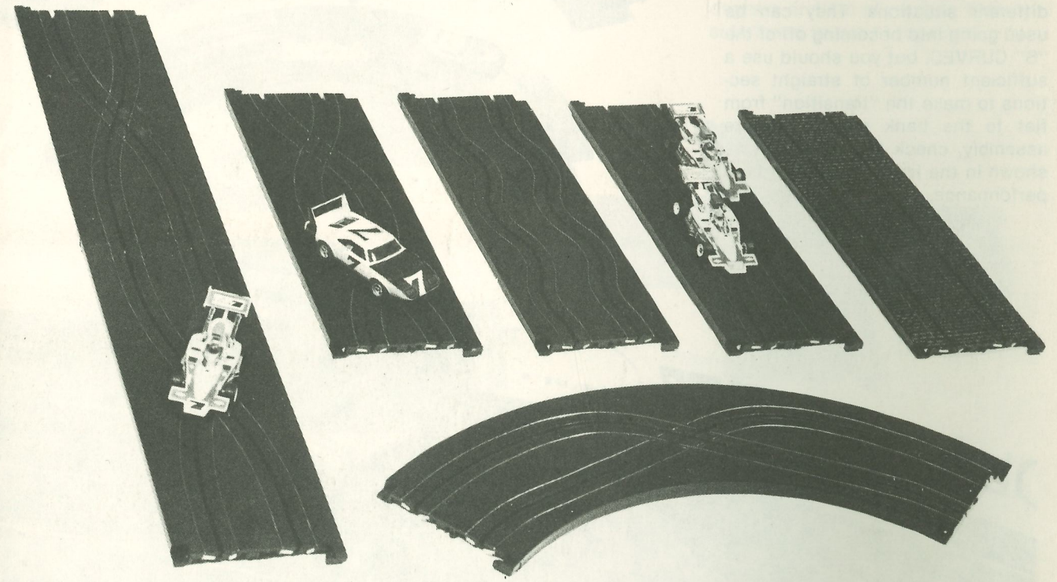
AFX Magna Traction cars for night racing. Lights are fitted to the cars, and provide exciting racing with the lights out. The cars feature the AFX Magna Traction pancake chassis. Now you can race your own 24 hours of Daytona, or LeMans.



AFX HIGH PERFORMANCE TRACK

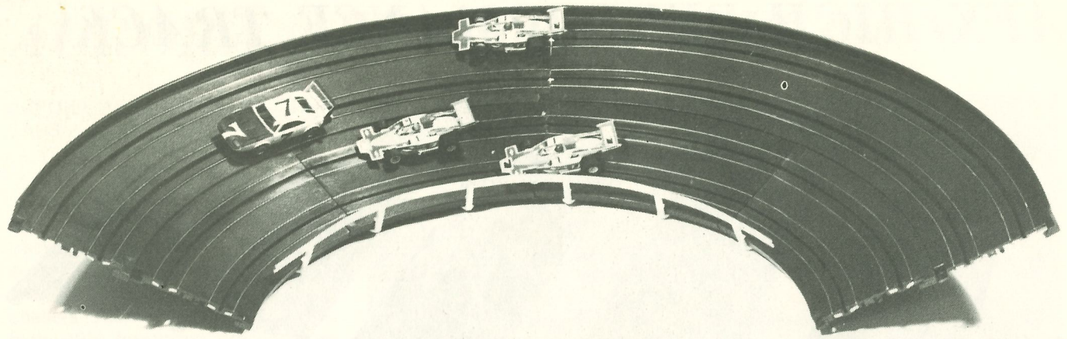


FIVE DIFFERENT lengths of "straight" tracks make it easy for you to build any type layout you desire and fit it to "your space". Left to right, the popular '15" section', the 9" standard section, the short 'fitting' sections 7", 6", and 5" respectively.



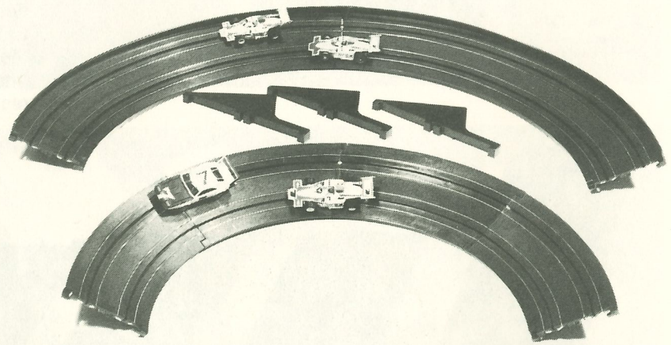
You can install "interesting" sections of track in your layout using one or more of the following special tracks, that make racing and cornering more exciting. Left to right, a pair of CRISSCROSS tracks that can be used together or independently anywhere on the track for "lane swapping". The DOUBLE CROSS is a single 9" section of track that does the same thing in a shorter space. The WIGGLE track does just what it says, your car "wiggles" as it goes through this section. The SQUEEZE actually puts both cars "almost" in the same lane. The COBBLESTONE track is a rough track which has less traction. In the foreground is a section (they come in pairs) of the curved CRISSCROSS which can be used separately or together.

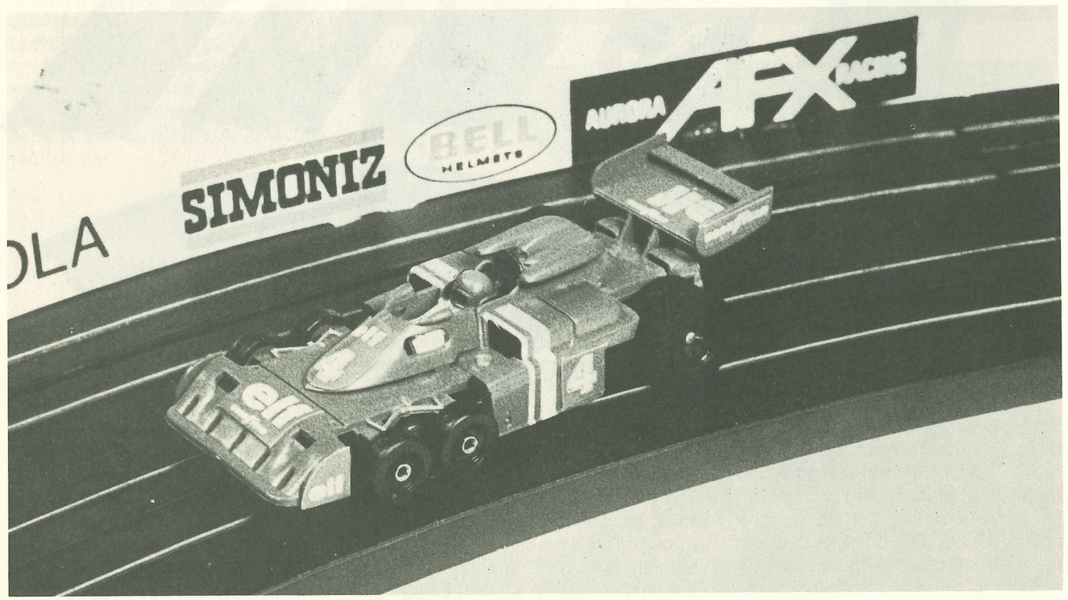
FOR RACING FUN.....try some of these "special" track sections.

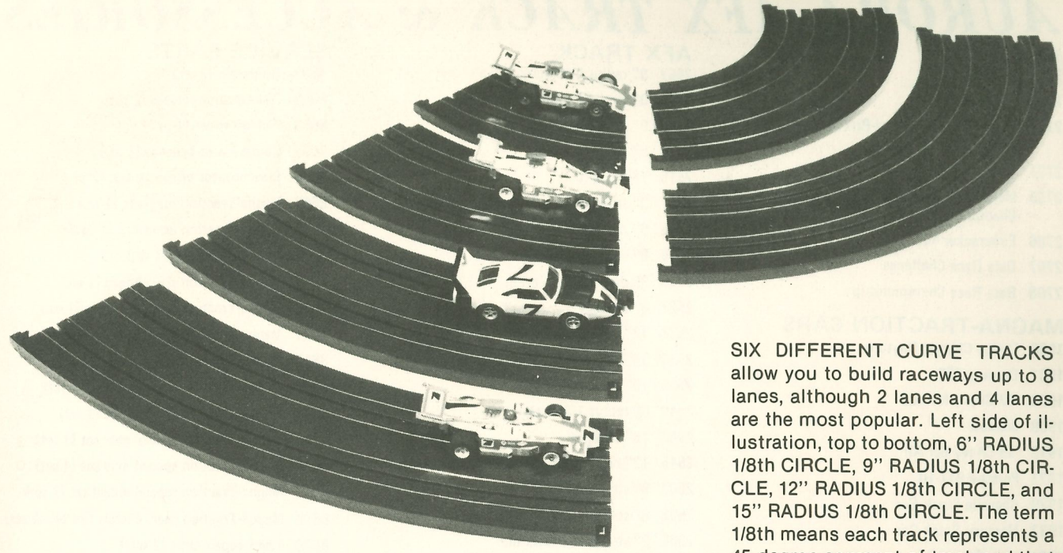


SUPERSPEED RACING on "banks" like the fast tracks of Daytona and Pocono is possible using the AFX banked track sets. Here's a four lane banked setup of 180 degrees (one-half a circle) measuring 24" wide. This combination is made up using the 12" RADIUS DAYTONA BANKED CURVE SET together with the 9" RADIUS MONZA BANKED CURVE SET. You can widen this out by putting straight sections in the middle, but you'll have to drive your cars FAST to keep them from falling into the center of the raceway.

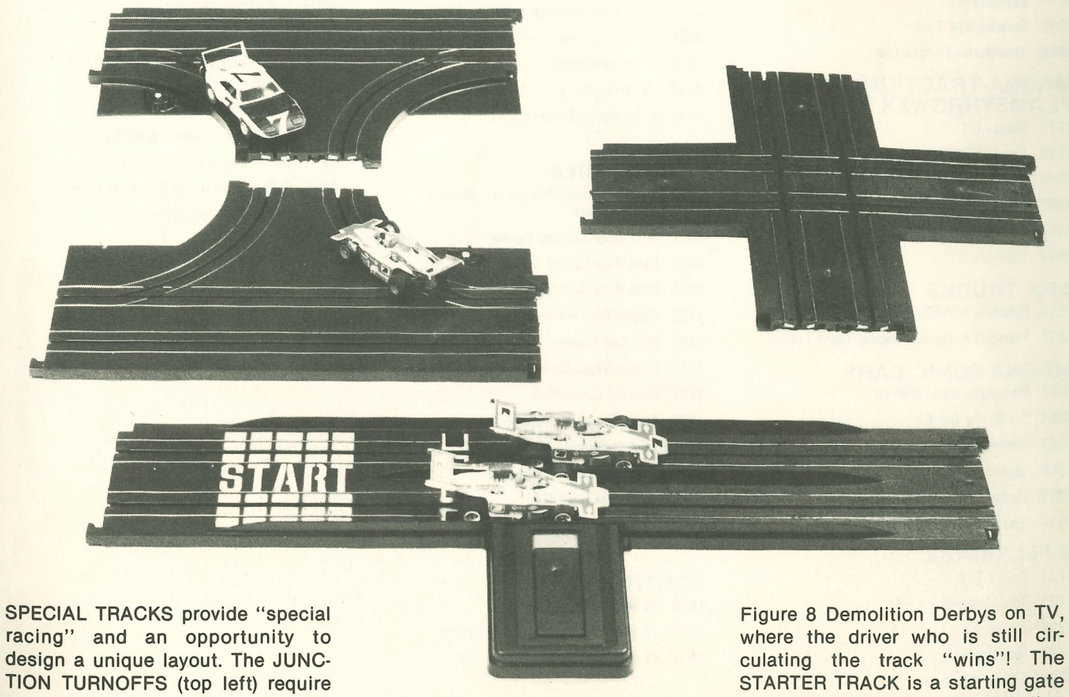
The 12" RADIUS DAYTONA BANKED CURVE (top) and the 9" RADIUS MONZA BANKED CURVE SET can be used separately in a number of different situations. They can be used going into or coming off of the "S" CURVES, but you should use a sufficient number of straight sections to make the "transition" from flat to the bank smooth. Before assembly, check the rail height as shown in the track chapter for best performance.







SIX DIFFERENT CURVE TRACKS allow you to build raceways up to 8 lanes, although 2 lanes and 4 lanes are the most popular. Left side of illustration, top to bottom, 6" RADIUS 1/8th CIRCLE, 9" RADIUS 1/8th CIRCLE, 12" RADIUS 1/8th CIRCLE, and 15" RADIUS 1/8th CIRCLE. The term 1/8th means each track represents a 45 degree segment of track and that it would take 8 sections to make a full circle of 360 degrees. On the right side of the illustration on top is the 6" RADIUS 1/4th CIRCLE, below it the 9" RADIUS 1/4th CIRCLE of 90 degrees or 1/4th of a circle. Side by side these tracks fit together.



SPECIAL TRACKS provide "special racing" and an opportunity to design a unique layout. The JUNCTION TURNOFFS (top left) require "switching" by hand from the main road to the side road and can be used to run your cars into the "Paddock" area or to the gas pumps. The INTERSECTION or CROSSOVER was made famous by those dreadful Figure 8 Demolition Derbys on TV, where the driver who is still circulating the track "wins"! The STARTER TRACK is a starting gate that starts both cars off the line "equally" at the same time. Great for "no cheat" racing!

AURORA AFX TRACK & ACCESSORIES

AFX SETS

2701 Daytona 500
2702 Riverside
2703 Mario Andretti Grand Prix International Challenge
2704 Racin' Rig & Smokey
2705 Mario Andretti Grand Prix International Championship
2706 Firecracker 400
2707 Data Race Challenge
2708 Data Race Championship

MAGNA-TRACTION CARS

1900 Dodge Charger Daytona
1901 Camaro Z28
1903 '57 Chevy Nomad
1908 Shadow
1913 '55 Chevy Bel Air
1921 Porsche 917-10
1929 Chevelle Stock Car
1932 Mercury Stock Car
1934 Vega Funny Car
1941 '56 Ford Pickup Truck
1942 Custom Van
1943 Ford Street Van
1946 Dodge Police Van
1948 Monza GT
1952 BMW 320i Turbo
1954 Corvette GT
1955 Porsche 934 Turbo
1956 Thunderbird Stock Car

MAGNA-TRACTION FLAMETHROWER

1977 Monza GT
1978 Camaro Z28
1979 Chevy Police Car w/roof lights
1980 BMW 320i Turbo
1981 Firebird
1982 Corvette GT

AFX TRUCKS

1156 Peterbilt w/AFX Express Trailer
1157 Peterbilt & Aurora Racing Team Trailer

MAGNA-SONIC CARS

1062 Plymouth Road Runner
1064 '55 Chevy Bel Air
1067 Chevelle Stock Car
1069 Javelin
1073 Dodge Magnum Stock Car
1074 Thunderbird Stock Car

G-PLUS CARS

1731 Lola T-330
1733 Texaco-Marlboro F1
1734 Ferrari F1
1735 Indy Special
1736 Ferrari Daytona
1738 6-Wheel Elf F1
1783 Lotus 79 F1
1784 Shadow

AFX TRACK

2467 9" radius high bank curve
2506 9" straight cobblestone
2514 9" radius 1/8 circle
2515 5" straight
2516 7" straight
2517 9" straight
2518 6" radius ¼ circle
2519 9" radius ¼ circle
2523 90 degree intersection
2527 6" straight
2528 12" radius 1/8 circle
2532 36" flex track w/bank supports
2533 15" radius 1/8 circle
2540 6" radius 1/8 circle
2542 15" straight
2545 12" radius high speed curve (½ circle)
2601 9" straight wiggle
2602 9" straight double cross
2606 9" straight cobblestone
2613 9" radius crisscross (pr.)
2617 9" straight
2619 9" radius ¼ circle
2624 9" straight crisscross
2628 12" radius 1/8 circle
2631 9" radius ¼ circle shut-off road
2633 15" radius 1/8 circle
2636 9" straight terminal track
2637 15" straight terminal track
2639 9" squeeze track
2642 15" straight
2651 9" straight adaptor tracks

ACCESSORIES

1420 Magna-Traction Pitcase w/2 Magna-Traction cars
1422 Data Race Control Center
1423 Data Race Sound Tower
1430 Data Race Computer Center
1463 Magna-Traction Hop-up Kit
1493 Dial Lap Counter
1531 2 Lane Track Joiners
1544 Snap-on Guard Rail
1565 Track Elevation Supports
1583 AFX Handbook Vol. III
2562 Maintenance and Test Kit
2596 Dust Rust Must Go
2597 X2C Oiler

CONTROLLERS

1436 45 ohm speed controller
1437 45 ohm speed controller w/brakes
1438 45 ohm speedometer controller

POWER PACKS

1442 AFX Safety Wall Pak
1444 AFX High Performance Power Pack

SERVICE PARTS

8601 Guide pin (2 ea.)
8602 Pick-up shoe springs (2 pr.)
8603 Pick-up shoes (1 pr.)
8604 Commutator brushes (1 pr.)
8605 Commutator brush springs (2 pr.)
8606 Magna-Traction magnets (1 ea.)
8607 Magna-Traction armature (1 ea.)
8608 Gear plate clamp (1 ea.)
8609 Magna-Traction std. chassis (1 ea.)
8610 Magna-Traction std. gear plate (1 ea.)
8611 Magna-Traction std. gear set (1 set)
8612 Magna-Traction std. axle set (1 set)
8613 Magna-Traction std. wheel set (1 set)
8614 Magna-Traction std. tire set (1 set)
8615 Magna-Traction special gear set (1 set)
8616 Magna-Traction special axle set (1 set)
8617 Magna-Traction special wheel set (1 set)
8618 Magna-Traction spec. chassis tire set (1 set)
8620 Track repair clips (2 sets)
8901 G-Plus axle set (1 set)
8902 G-Plus gear set (1 set)
8903 G-Plus magnets (1 pr.)
8904 G-Plus armature (1 ea.)
8905 G-Plus arm. bearings, Flux Coll, Mag. Ret. (1 set)
8906 G-Plus commutator brush (1 pr.)
8907 G-Plus commutator brush spring (2 pr.)
8908 G-Plus pick-up shoes (1 pr.)
8909 G-Plus pick-up shoe springs (2 pr.)
8910 G-Plus chassis w/tabs (1 ea.)
8911 G-Plus chassis w/o tabs (1 ea.)
8912 G-Plus brush barrels & holders (1 set)
8913 G-Plus rear wheel & tire (1 pr.)
8914 G-Plus front wheel & tire set (1 pr.)
8915 G-Plus guide pin (steel) (1 ea.)

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